

K–3 Module

Unit 2

Reducing, Reusing, and Recycling Classroom Waste

Lesson 1

Reducing the Amount of Plastic That Goes to a Landfill

Lesson 2

What Do I Do with It Now?

Lesson 3

Classroom Exchange of Unwanted Items

Lesson 4

Making Recycled Paper by Hand

Lesson 5

Sounds from Reused Materials and Songs About Reusing and Recycling

The students were very excited about this unit. The kids kept asking me, “What are we going to do tomorrow?”

— Donna Flores, third-grade teacher, Nightingale Elementary School, Stockton Unified School District

I used the five lessons with a kindergarten and first-grade combination class at a two week science-based intercession program. It takes a lot of time to gather materials and to prepare for the lessons; however, the learnings that take place with the students make it all very worthwhile. Students were excited with what they learned and were eager to share with others (parents, other kids, and other teachers).

— Beverly Hayes, kindergarten and first-grade teacher, John A. Otis Elementary School, National School District

K-3 MODULE

Unit 2: Reducing, Reusing, and Recycling Classroom Waste

Overview

UNIT 2'S CONCEPT

Reducing, reusing, and recycling materials help to conserve natural resources and save landfill space.

The five lessons in this unit are:

LESSON 1: REDUCING THE AMOUNT OF PLASTIC THAT GOES TO A LANDFILL

Lesson's concepts:

- Many plastics end up in a landfill.
- Humans can reduce the number of plastic products that they buy and use in order to conserve natural resources, such as fossil fuels, and to save landfill space.

In Lesson 1 students will:

- Identify items in the classroom that are made from plastic.
- Sort plastics by their plastic container code numbers and place a sample of the different types of plastics on a sorting sheet.
- Identify which plastics are recycled in their community.
- Apply their knowledge about the importance of conserving natural resources, such as fossil fuels from which plastic is made, by developing a plan to reduce, reuse, and recycle plastics in the classroom.

LESSON 2: WHAT DO I DO WITH IT NOW?

Lesson's concept: "Many materials can be recycled and used again, sometimes in different forms." (*Benchmarks for Science Literacy*, page 119)

In Lesson 2 students will:

- Examine samples of various types of beverage containers.
- Test cans for magnetism, inspect plastic containers for number codes, and identify

differences between two plastic-coated cardboard containers.

- Determine which containers can be reused.
- Identify which containers can be recycled in their community.

LESSON 3: CLASSROOM EXCHANGE OF UNWANTED ITEMS

Lesson's concept: "Some materials can be used over again." (*Benchmarks for Science Literacy*, page 188)

Students bring to class items (e.g., books, clean toys, laundered clothing) that they or their family members no longer want and exchange them for other items that they do want.

LESSON 4: MAKING RECYCLED PAPER BY HAND

Lesson's concepts:

- Waste paper can be made into recycled paper in order to conserve trees and space in landfills.
- Buying products made from recycled materials continues a cycle that conserves natural resources.

In Lesson 4 students will:

- Listen to descriptions and conclude that most paper is made from trees.
- Observe various types of paper with a magnifying lens.
- Use various steps involved in recycling wastepaper by making their own recycled paper in the classroom.
- Make planters out of recycled paper and plant seeds or seedlings.

- Look for the symbol on products that indicates the product is made from recycled material.
- Discuss how “closing the loop” benefits the environment and people.

LESSON 5: SOUNDS FROM REUSED MATERIALS AND SONGS ABOUT REUSING AND RECYCLING

Lesson’s concept: Some discarded products could be reused to make new products and, thus, lessen the amount of waste that goes to landfills.

In Lesson 5 students will:

- Sing “On Top of the Landfill” and talk about what the lyrics mean.
- Use familiar tunes to write lyrics about reusing and recycling materials.
- Learn and sing songs composed by other students.
- Make musical instruments out of discarded items and use them in the performance of their songs.

Required Books to Implement Unit 2

- **For Lessons 2 and 3:**

Showers, Paul. *Where Does the Garbage Go?* Illustrated by Rand Chewning. Let’s-Read-and-Find-Out Science series. New York: HarperCollins Children’s Books, 1994.

- **For Lesson 4:**

Lauber, Patricia. *Be a Friend to Trees.* Illustrated by Holly Keller. Let’s-Read-and-Find-Out Science series. New York: HarperCollins Children’s Books, 1994.

Recommended Books to Implement Unit 2

- **For Lesson 1:**

Brooks, Felicity. *How Things Are Made.* Designed by Chris Scullen. Finding Out About series. Tulsa, Okla.: EDC Publishing, 1989.

PROJECTS

Projects provide hands-on experiences for students. Some lessons in this unit are project-based and encourage students to apply what they have

learned in the classroom. Some project-based lessons, which are service-learning oriented, encourage students to participate in improving the environment in their school and community.

Six projects that address this unit on reusing and recycling classroom waste are described below. Examples are given of schools that have completed projects that support reusing and recycling classroom waste. Teachers are encouraged to select one of these projects with their students or to have their students develop one of their own. If students implement an applicable project, they and their teachers are encouraged to send a description of the project to the California Integrated Waste Management Board’s Office of Integrated Education, MS-14A, P.O. Box 4025, Sacramento, CA 95812-4025.

- **Project 1:** Students develop a plan to reduce, reuse, and recycle plastics in the classroom. (Lesson 1)
- **Project 2:** Students decorate cardboard boxes for gathering items that can be reused in the classroom and those that can be recycled. They should clearly mark these. Students can also decorate cardboard boxes to give to other classes. (Lesson 2)

Monterey Road Elementary School, Atascadero Unified School District¹

Students at Monterey Road Elementary School began a recycling program at school. They provided each classroom with a recycling container to collect recyclables, instructions on how and what to recycle, and a lot of encouragement. They monitored, collected, sorted, and sent out the recyclable materials. With the money they raised, along with donations solicited from parents and local businesses, they planted trees in the school yard and built and installed birdhouses in them, resulting in the creation of wildlife homes and more oxygen for the planet.

- **Project 3:** Students reuse paper and other materials in the classroom. They decorate boxes of scrap paper available for various projects. They make books or journals about recycling out of discarded wallpaper ends (for covers) and rolls of paper (for pages inside the covers). Wallpaper companies and newspaper offices and printing shops are good sources for these materials. (Lesson 3)

¹“Jiminy Cricket’s Environmentality Heroes.” The Walt Disney Company, Inc., and the State of California’s Environmental Education Interagency Network.

Pioneer Elementary School, Escondido Elementary School District²

Mary Burgess, who teaches in Escondido Elementary School District, San Diego County, embarked on a campaign to solicit donations from local businesses. Ms. Burgess developed a “Reduce, Reuse, Recycle” flyer explaining the need she had for scrap materials. She distributed the flyer to local businesses and received donations from a variety of businesses. One contact, a wallpaper store, donated leftover pieces of wallpaper. Another contact, a local print shop, donated leftover paper. Ms. Burgess folded the wallpaper in half, inserted reused paper, and bound the books with a few staples—now her students have fancy journals or books. A local print shop which cannot use the paper at the end of the paper rolls donated piles of “clean” white paper in different sizes. The paper fills a variety of classroom uses, including language arts and mathematics assignments.

If you would like additional ideas on how to reuse materials, contact the California Integrated Waste Management Board’s Office of Integrated Education, MS-14A, P.O. Box 4025, Sacramento, CA 95812-4025; (916) 341-6769 or visit the CI-WMB Web site at www.ciwmb.ca.gov.

- **Project 4:** Students make cards (e.g., for Mother’s Day or Father’s Day, birthdays, notes) out of recycled paper to give as gifts. Some could be sold for fund-raising purposes. (Lesson 4)

Orick Elementary School, Orick Elementary School District³

Students at Orick Elementary School in Humboldt County are putting mixed paper to good use. The students recycle the paper and create greeting cards. The cards are then sold at a local store. The students are getting their message out that managing natural resources is not only good for the environment but also can be profitable.

- **Project 5:** To let others know the importance of reusing and recycling, students sing the songs they wrote for other classes. (Lesson 5)

Valley View Elementary School, Coachella Valley Unified School District⁴

One of the students from Valley View Elementary School wrote a RAP song entitled “Have Fun! Learn & Recycle” depicting a place named Valley Land

²“Going the Extra Mile,” *Reusable News*. Sacramento: Integrated Waste Management Board (fall, 1994).

³“Going the Extra Mile,” *Reusable News*. Sacramento: Integrated Waste Management Board (fall, 1993).

⁴“Jiminy Cricket’s Environmental Heroes, 1994-97.” The Walt Disney Company and the State of California’s Environmental Education Interagency Network, 1999, p. 44.

where “people didn’t recycle, not even their cans.” The song goes on to describe a land ravaged by pollution and a mighty hero, with this message: “Just follow your heart and do your part.” The class performed the RAP song for the rest of the school in front of a giant wall built out of soda cans. Valley View students were educating others about the environment and the importance of recycling and having fun doing it!

- **Project 6:** With the class, students plant seedlings, shrubs, and wildflowers on the school campus or in a nearby park. The U.S. Forest Service, the California Department of Forestry, and some timber companies and nurseries will often donate to schools seedlings from native trees and other plants. If seedlings are to be planted on the school grounds or in other parts of the community, it is recommended that the species of the seedlings be appropriate to the existing soil and weather conditions in the locale where they will be planted. This will ensure a greater survival rate for the plants. (Lesson 4)

Other Projects

Kimball Elementary School, National School District⁵

Two years ago, Jeannene Smith’s third- and fourth-grade students looked into the amount of trash that went to the landfill each day from their school. At that time they were producing between six to eight bags of trash per day. The school was purchasing cartons of milk for students. As a result of the research conducted and recommendations made by Ms. Smith’s class, Kimball Elementary School began purchasing little milk bags. Now they produce only two bags of trash per day.

Marguerite Hahn Elementary School, Cotati-Rohnert Park Unified School District⁶

Sharon Janulaw’s kindergarten class at Marguerite Hahn Elementary School created junk sculptures to show that one person’s junk can be someone else’s treasure. This emphasizes how some things can be reused. The sculptures were displayed at an Earth Day celebration sponsored by Recycle Town and during open house at the Hahn School.

Note: To acquire a copy of “Jiminy Cricket’s Environmental Heroes,” contact the California Integrated Waste Management Board’s Office of Integrated Education at (916) 341-6769.

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⁵Submitted by Bonnie Styles, National School District.

⁶Submitted by Sharon Janulaw, kindergarten teacher and field tester for *Closing the Loop*, Marguerite Hahn Elementary School, Cotati-Rohnert Park Unified School District.

Picture intentionally deleted.

Students in Sharon Janulaw's kindergarten class at Marguerite Hahn Elementary School designed a junk sculpture from items that would have gone to the classroom trash can.

LESSON 1: Reducing the Amount of Plastic That Goes to a Landfill

LESSON'S CONCEPTS

- Many plastics end up in a landfill.
- Humans can reduce the number of plastic products that they buy and use in order to conserve natural resources, such as fossil fuels, and to save landfill space.

PURPOSE

Students will identify products made from plastic, learn how to distinguish different types of plastic by their plastic container code numbers, identify which types of plastics can be recycled in their community, and develop a plan to reduce the amount of plastic that goes to the landfill.

OVERVIEW

In this lesson students will:

- Identify items in the classroom that are made from plastic.
- Sort plastics by their plastic container code numbers and place a sample of the different types of plastics on a sorting sheet.
- Identify which plastics are recycled in their community.
- Apply their knowledge about the importance of conserving natural resources, such as fossil fuels from which plastic is made, by developing a plan to reduce, reuse, and recycle plastics in the classroom.

CORRELATIONS TO CALIFORNIA'S CONTENT STANDARDS AND FRAMEWORKS AND TO BENCHMARKS FOR SCIENCE LITERACY

- Students compare and classify different types of plastics and identify which ones can be recycled in their community.
 - "Properties of materials can be observed, measured, and predicted. As a basis for understanding this concept, students know: objects can be described in terms of the materials they are made of . . . and their physical properties . . ." (*Science Content Standards, Grades*

K-12; Kindergarten; Physical Sciences, Standard 1a)

- "Through science and technology, a wide variety of materials that do not appear in nature at all have become available, ranging from steel to nylon to liquid crystals." (*Benchmarks for Science Literacy, page 188*)
- "An awareness of recycling, both in nature and in human societies, may play a helpful role in the development of children's thinking." (*Benchmarks for Science Literacy, page 119*)
- "To participate effectively in society, students need to: Develop personal skills . . . group interaction skills (and) . . . social and political participation skills." (*History-Social Science Framework, page 24*)
- Students classify plastics according to their plastic container code numbers.
 - "Students sort and classify objects." (*Mathematics Content Standards for California Public Schools, Kindergarten Through Grade Twelve, page 2*)
- Students describe items in their homes that are made from plastics and identify those which could be reused, recycled, or reduced in usage.
 - "Students listen and respond to oral communication. They speak in clear and coherent sentences." (*English-Language Arts Content Standards for California Public Schools, Kindergarten Through Grade Twelve, page 5*)

SCIENTIFIC THINKING PROCESSES

observing, communicating, comparing, classifying, relating, applying

TIME

30 minutes to prepare for the lesson; 45–60 minutes to implement the lesson

VOCABULARY

solid waste, petroleum, petroleum products, plastic, resin

PREPARATION

- 1. Read the “Background Information for the Teacher” at the end of this lesson.
- 2. Ask students to bring several rinsed out plastic containers, including a soda bottle or gallon milk jug. Check to see what containers have been brought in; then collect any additional containers you might need so that each pair of students will have code 1 and code 2 plastics (the codes are usually stamped on the bottom of the container). Also, collect plastic bags with the code 4 and polystyrene cups with the code 6.
- 3. Make a copy of the sorting sheet, “I Can Sort Plastics,” for each pair of students, (page 58). Ideally, obtain heavy-weight paper that has been used on one side on which to copy the sorting sheet.
- 4. Duplicate the handout, “Plastics Coding System,” to send home with students (page 59).
- 5. Find out what types of plastics are recycled in your community.

MATERIALS

- Piece of butcher paper on which to record a list

Note: See “Note” in “Procedure,” section “C,” for an alternate way to do this activity.

- A variety of plastic containers with coded numbers (See “Preparation” step “2.”)
- A sorting sheet, “I Can Sort Plastics,” for each pair of students
- Scissors
- Stapler, tape, and/or nontoxic glue
- A copy of “Plastics Coding System” for each student

PRE-ACTIVITY QUESTIONS

- A. Have each student locate in the classroom and bring to the middle of the classroom

floor one or two items made from plastic. Cover up the items. Ask students to look around the room. What is left? *Some plastic items, such as light switches, chairs, computer parts; and nonplastic items, such as the chalkboard, windows, the door, bookshelves, books.*

Note: If you do not want students to bring items to the middle of the class, students could write the words of the different items on pieces of cardboard, and these could be placed in the middle of the classroom. However, the impact will not be as great as when students see the items missing from the classroom.

- B. Have students help you make on a piece of butcher paper a list of the plastic items that students selected.
- C. Discuss with students:
 - Are there more plastic items in the classroom than nonplastic items?
 - Of the items made from plastic, which look as if they will be used once and then thrown away into the landfill? These will become solid waste.
 - Of the items made from plastic, which look as if they will be used once and placed in a recycling bin?
 - Of the items made from plastic, which look as if they will be used more than once? Used many times? Will last for a long time?
- D. Help students to identify additional items made from plastic and record the names of these on a piece of butcher paper. For example: crayons, plastic markers, chairs, doormats, desktops, countertops, telephone, computer parts, white boards, anything laminated, plastic toys.
- E. Have students return all the plastic products to their original places.

PROCEDURE

In this activity, students learn that plastics are made from petroleum. One way to save petroleum is by reducing the amount of plastic we use, reusing plastic items, and recycling plastics. To identify those items that can be recycled, students will learn how to sort plastics by their plastic container code numbers. Unfortunately, many types of plastic are not being recycled because there are not enough companies that make products from recycled plastic, which is due in part to the difficulty of separating different types of plastic resin.

Note: If you do not want students to complete their own plastic container sorting sheets, this activity can be done as a class using large sorting circles, with each circle labeled with a plastic container code number. As an alternate activity, students can design a bulletin board or poster on which to display plastics by their plastic container code numbers. On the same poster they could also identify those plastics that can be recycled in their community.

- A. Discuss with students how our finite crude oil (a fossil fuel) reserves can be made to last longer. Remind students that plastic is made from petroleum, which is made from crude oil. *By conserving crude oil and using fewer products, reusing the products, and recycling items, such as plastics, that are made from crude oil.* (In California, it is a state law that used motor oil and used oil filters must be recycled at designated used oil collection facilities.)

Note: Information and lessons on recycling used oil are provided in the K-3 Module, Unit 5, and the 4-6 Module, Unit 4.

- B. Tell students that people can recycle plastics so less crude oil will be necessary to make new products from plastics. Explain that there are different types of plastic containers and bags, most of which are coded with a number. The number is usually embossed or printed on the bottom of the container or bag, and it identifies the type of resin from which the plastic container or bag was made. Because the different resins have different chemical compositions, they cannot be recycled together. Therefore, recycling companies separate the plastics into categories, based on their resin number. In many communities, residents and businesses are able to recycle only certain types of plastics,

based on the available market. In the next activity, students will learn more about identifying different types of plastics that are recycled in their community. Do the following:

- Have students work in pairs.
- Provide a variety of plastic containers and pieces of plastic bags with different plastic container code numbers.
- Provide an “I Can Sort Plastics” sheet for each pair of students.
- Help students cut out the plastic container code number from 1, 2, 4, and 6 types of plastic.
- Help students staple, tape, or glue each type of plastic in the appropriate place on their sorting sheets.
- Share with students what plastics are recycled in their community. Have students mark on their sheets those plastics that can be recycled in their community.
- Discuss the differences that students see and feel concerning each type of plastic.
- Once the sorting sheets are completed, some of these sheets can be mounted on a bulletin board and others can be taken home.

DISCUSSION/QUESTIONS

- A. Discuss with students what should be done with the remains of the plastic containers and bags that were not used on the sorting sheet. *Some can be reused or recycled; others will be solid waste and will need to be placed in a landfill.*
- B. Ask students to review the list of items made from plastic and to determine whether they want to make any changes to the list. Discuss whether any items should be removed or added to the list and have students give their reasons.
- C. Discuss with students:
 - What is plastic made from? *Petroleum.* (Students might not know that plastics are also made from natural gas.)
 - What is petroleum made from? *Crude oil.*
 - What category of natural resources is crude oil? *Fossil fuels, which are energy sources.*

- Is there an unlimited amount of petroleum for us to use? *No.* If students say yes, explain to them that crude oil comes from ocean plants that lived millions of years ago. These plants died, and through time and the pressure from layers of rock that trapped the plants, crude oil was formed. There is only a certain amount of oil in the ground that is presently easy to get. Petroleum is made from crude oil and is used to make many items, including gasoline, motor oil, and plastics.
- How can we make the amount of petroleum that is left last a long time? *Use only what you need; don't waste it; recycle it if it can be recycled in your community.*
- What other natural resources were used to make things in this classroom? *Plants, minerals.*
- What can we use instead of disposable (those that will be landfilled after one use) plastic? *Use the types of plastic that can be used many times; use items made from materials that can be reused or recycled.*
- How do our personal choices of what we buy and use impact the amount of solid waste that ends up in a landfill?

APPLICATION

- A. Provide a copy of "Plastics Coding System" to each student. Ask them to circle or color those plastics that are recycled in their community. Note that often only plastics with

Picture intentionally deleted.

Students in Betsy Weiss's kindergarten and first-grade class at Paden Elementary School reuse discarded plastic to make useful items.

the resin code 1 and the clear plastic 2 are recycled. Then ask them to take these sheets home to share with their parents.

Homework Assignment: Ask students to list at least ten items in their homes that are made from plastic and to write the plastic container code number for each of these plastics.

- B. The following day, ask students to share their lists and add to the list started at the beginning of the lesson.
- Have students help you check off those items that they can recycle.
 - Have students circle those items they can reuse.
 - Ask which items will become solid waste and will need to be placed in a landfill.
 - Have students underline the names of those plastic items that they can use less often.
 - Ask:
 - Which items can be kept from going to the landfill if we use fewer of them?
 - How easy is it to use less plastic in our lives?

Project Idea: Have students develop a plan to reduce, reuse, and recycle plastics in the classroom.

- C. Ask students to write a sentence or two in their journals about what they have learned in this lesson. They can also draw a picture. Have them share their journal entries in small groups. Check each student's writing.
- D. Find out and teach students (or ask a student to find out and report to the class) how to prepare plastic containers for recycling in your community (e.g., separate by code, rinse with water, step on container to compact it before placing it in the curbside recycling bin).
- E. Ask students to design another use for discarded plastic containers and other items.
- F. Have students share with their classmates what they have made.

EXTENSION

Encourage students to conduct research to find out what other products are made from plastic or from petroleum.

RESOURCES

Videos

The Adventures of Wayan and the 3 R's. Distributed by The Video Project, n.d. (15 minutes).

Through the actions of Wayan, a six-year-old native of the Island of Bali, and a shadow puppet show, viewers are introduced to the 3 R's. Children are shown picking up plastic litter and encouraging their community to reuse and recycle plastics. Then the children make props out of reused plastic for a parade.

Bottom of the Barrel. 3-2-1 Contact series. Pleasantville, N.Y.: Sunburst/Communications, 1993 (30 minutes).

Describes how oil is used to create plastics, heat buildings, fuel cars, and provide energy for industry. Explains that pollution can result when using and transporting oil.

Oil and Its Products. Produced by Wolfgang Bayer, 1979. New York: BFA Educational Media (distributor) (14 minutes).

Explains how the discovery of oil has affected manufacturing, transportation, and lifestyles. Describes how oil is formed and how it is located, mined, and refined. Introduces some environmental problems created by oil.

Picture intentionally deleted.

Books

Brooks, Felicity. *How Things Are Made*. Finding Out About series. Tulsa, Okla.: EDC Publishing, 1989.

Explains from what natural resources things are made. Contains illustrations and descriptions of how some items are made. These include leather shoes, clay pottery, clothing, paper, glass bottles, cans, plastic blocks, and soap.

Brown, Laurie Krasny, and Marc Brown. *Dinosaurs to the Rescue! A Guide to Protecting Our Planet*. New York: Little, Brown, and Company, 1992.

Dinosaur characters describe what students can do to conserve natural resources and reduce, reuse, and recycle items. Includes a section that discusses plastics.

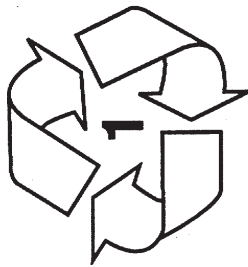
Web site

For information on plastics, visit the Web site for the Plastics Marketing Guide at: www.ci-wmb.ca.gov/mrt/mrktrschr/mktguides/plastic.htm.

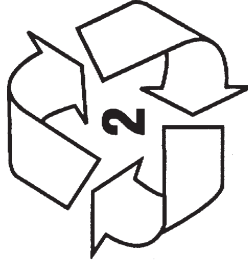
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Children look at the bottom of plastic containers for the resin code and separate the plastics that can be recycled in their community. The photographs were taken at the Solar Community Housing Association, Homestead CO-OP.

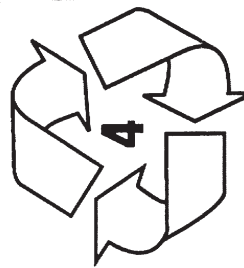
Student's Page
I CAN SORT PLASTICS



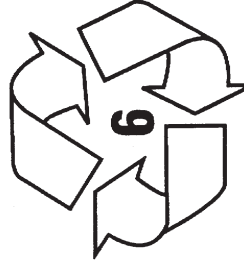
PETE



HDPE



LDPE



Polystyrene

I can sort _____ by their plastic container code numbers.

PLASTICS CODING SYSTEM

To help consumers identify more easily the different types of plastic, a numbered coding system has been developed. You can find these plastic container code numbers stamped on the bottom of containers and other plastic items or printed on plastic bags. Number 1 and 2 types of plastics are the most commonly recycled.



PETE (polyethylene terephthalate): Plastic is soft, generally clear. This plastic is used for food and beverage containers, such as soda bottles, cooking oil bottles, and peanut butter jars.



HDPE (high-density polyethylene): Plastic is translucent or white or colored. This plastic is used for milk, water, and juice bottles; bleach and detergent bottles; margarine tubs; and some grocery bags.



PVC VINYL (polyvinyl chloride): Color of plastic varies. This plastic is used in glass cleaner bottles, some cooking oil containers, and some detergent powders. (PVC has properties of good chemical resistance, which is important for holding household detergents and other harsh materials.)



LDPE (low-density polyethylene): Color varies. This plastic is used in food packaging, shrink-wrap, carry-out bags, and heavy-duty bags.



PP (polypropylene): Color of plastic varies. This plastic is used in butter and margarine tubs, yogurt containers, screw-on caps, and drinking straws.



PS (polystyrene): Plastic may be clear, hard, or in foam form. This plastic is used in cutlery and plates, foam coffee cups, egg cartons, meat trays, and yogurt cups.



OTHER: Color varies. Containers made of more than one resin type. This plastic is used in squeezable syrup and condiment bottles and some microwave food trays.

Definitions adapted from National Polystyrene Recycling Company, *How-to-Recycle Polystyrene*, 25 Tri-State International, Lincolnshire, IL 60069; (707) 945-2139.

BACKGROUND INFORMATION FOR THE TEACHER

Note: It is recommended that students complete Unit 1, “Conserving Natural Resources,” in the K–3 Module, to provide them with background for this lesson and other lessons in this unit.

Reducing the number of items people buy and use prevents waste from being generated in the first place. Many people recycle aluminum, paper, glass, and plastic, but recycling still requires the handling and transporting of materials and the remanufacturing steps which consume energy. Reducing and reusing products conserves natural resources and energy, reduces waste management costs, reduces pollution, and encourages innovation.

This lesson focuses on plastics, because many people believe that once they place plastics in a recycling bin the plastics will be recycled into other useful products. Unfortunately, the market for recycled plastics is small and has not been growing steadily. Most plastics (approximately 95 percent) are not recycled and are generally not recyclable at this time. Those plastics that are recycled are often shipped overseas for recycling.¹

Fortunately, in California, as a result of the State’s bottle and can recycling program, three of every five soda bottles (PETE) are being recycled. These plastic soda bottles are chopped up, melted, and molded into new products, such as bottles, fibers, paint brushes, stuffing for cushions and teddy bears, and linings of jackets.

In most recycling processes, the plastics must be sorted according to color and type of plastic before they are cleaned and reprocessed. The various types of rigid plastic packaging containers are coded with a number to indicate the type of resin from which they were made. This code number is embossed at the bottom of each container. Plastics with codes 1 and 2 are commonly recycled, because they are present in large quantities and have more markets available for them. At this time only PETE bottles and unpigmented (clear) HDPE bottles are generally recyclable. In 1996 the recovery rates for specific types of plastic containers were ap-

proximately 23 percent for HDPE containers and 36 percent for PETE containers.²

The CIWMB has estimated that only 3.5 percent of all plastics was diverted from landfills in 1995. The very small percent is primarily because there are not enough companies that make products from recycled plastic, which is due in part to the difficulty of separating different types of plastic resin.

Note: In this lesson students use the resin identification code developed by the Society of Plastic Industries (SPI). The code is used for identification purposes and does not mean that the plastic product is recyclable. California requires that the SPI code system be used on all rigid plastic containers sold in the state.³ This plastic coding system is further described on page 59.

Most plastics today are made from petroleum and natural gas, although the very first plastics were made from cornstarch. Plastics are made by linking together small single chemical units called monomers in repetition to build one large molecule called a polymer. The plastic polymers are made from hydrogen and carbon elements in combination with small amounts of oxygen, nitrogen, and other organic and inorganic compounds. When rearranged chemically, they produce a solid resin. The resins are used to make hundreds of different plastics.

Plastics are lightweight, durable, waterproof, easily molded, and relatively inexpensive to produce. Thus, they are used extensively in packaging. However, the same characteristics which make plastic an attractive packaging material also make it a special problem in the waste stream. Though lightweight, plastic is bulky and difficult to compact for shipping or to bury in landfills. Also, plastic is not biodegradable. Photodegradable plastics may break down into smaller pieces when exposed to enough sunlight but will never really disappear.

Plastics, like all other forms of garbage, consume

¹Written communication from Mark Murray, Executive Director, Californians Against Waste Foundation, October 12, 1998.

²Written communication with Michael Leao, Integrated Waste Management Specialist, Market Analysis and Services Section, California Integrated Waste Management Board, November 4, 1998.

³Written communication from Edgar Rojas, Waste Management Specialist, Secondary Materials and Technology Section, Waste Prevention and Market Development Division, California Integrated Waste Management Board, November 6, 1998.

valuable space in landfills. Although plastics take up only about 7 percent of landfill space by weight, they use between 10 and 20 percent by volume. Plastics are the fastest growing segment of the waste stream.

One way that everyone can reduce the amount of waste that goes to a landfill is by purchasing fewer plastic products that cannot be reused or recycled. Of the plastics that people already have, reusing (if safe to do so) should be a priority.

While society has become dependent on fossil fuels in the last 100 years for everything from transportation to the generation of electricity, to the manufacturing of plastics, and even to the production of fertilizer for much of the food consumed, fossil fuels are finite resources and also represent the single greatest contributor to pollution in society. Gasoline and diesel fuels for transportation represent the single greatest source of air pollution. Plastic is the fastest growing material taking up space in landfills, and because it is not biodegradable, it represents a permanent kind of litter. Oil spills on the land and in the water poison wildlife and pollute habitats, the by-products of petroleum often become hazardous waste, and pesticides and fertilizer contaminate farmland and groundwater.⁴ Therefore, reducing the amount of plastic that society uses conserves natural resources, including fossil fuels, and helps to decrease pollution.

Note: Additional information about plastics

⁴Written communication from Mark Murray, Executive Director, Californians Against Waste Foundation, October 12, 1998.

is included on the Web site listed in the “Resources” section in this lesson; in the “Background Information for the Teacher” in the 4–6 Module, Unit 2, Lesson 6; and in “Appendix C-VIII, Plastics,” of this curricular guide.



At a recycling center, recyclable plastics are separated by their plastic resin number and then baled. Then the bales are transported to a manufacturing plant, where new materials from these plastics are made.

NOTES

LESSON 2: What Do I Do with It Now?

LESSON'S CONCEPT

“Many materials can be recycled and used again, sometimes in different forms.” (*Benchmarks for Science Literacy*, page 119)

PURPOSE

Students will determine what beverage containers are made of and which containers can be reused or recycled.

OVERVIEW

In this lesson students will:

- Examine samples of various types of beverage containers.
- Test cans for magnetism, inspect plastic containers for number codes, and identify differences between two plastic-coated cardboard containers.
- Determine which containers can be reused.
- Identify which containers can be recycled in their community.

CORRELATIONS TO CALIFORNIA'S CONTENT STANDARDS AND FRAMEWORKS AND TO BENCHMARKS FOR SCIENCE LITERACY

- Students describe the characteristics of beverage containers by sight, weight, magnetic qualities, and other features. They complete a chart to compare what they have observed.
 - “Properties of materials can be observed, measured, and predicted. As a basis for understanding this concept, students know: objects can be described in terms of the materials they are made of . . . and their physical properties . . .” (*Science Content Standards, Grades K–12; Kindergarten; Physical Science, Standard 1a*)
 - “Many forms of matter are identifiable by their color, texture, or shape; by their hardness or flexibility; by their taste and odor; by the sound or

light that they emit and that we can perceive.” (*Science Framework*, page 41)

- “Students organize, represent, and compare data by category on simple graphs and charts.” (*Mathematics Content Standards for California Public Schools, Kindergarten Through Grade Twelve*, page 6)
- Students classify which beverage containers can be recycled and which cannot be recycled in their community.
 - “Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept . . . students will . . . compare and sort common objects based on two or more physical attributes (including color, shape, texture, size, weight).” (*Science Content Standards, Grades K–12; Grade 2; Investigation and Experimentation, Standard 4c*)
 - “An awareness of recycling, both in nature and in human societies, may play a helpful role in the development of children’s thinking.” (*Benchmarks for Science Literacy*, page 119)
- Students sort plastics according to their code numbers.
 - “Students sort and classify objects.” (*Mathematics Content Standards for California Public Schools, Kindergarten Through Grade Twelve*, page 2)

SCIENTIFIC THINKING PROCESSES

observing, communicating, comparing, categorizing

TIME

60 minutes to prepare for the lesson; 45–60 minutes per day for two days to implement the lesson

VOCABULARY

aluminum, ferrous metal, magnet, recyclable, resin, reusable

PREPARATION

- 1. Read the “Background Information for the Teacher” at the end of this lesson.
- 2. Make copies of each “Station Investigation Sheet” for each pair of students (pages 70–72). (Consider laminating these sheets and having students use wipeable pens to complete the chart. Then these sheets can be reused by other classes.)
- 3. Copy the “Beverage Containers Station Task Cards,” cut them apart, and place them at the appropriate stations (page 69). Consider laminating the cards for reuse.
- 4. Set up three stations with the following items:
 - Station 1—aluminum soda can and steel soup can
 - Station 2—plastic 2-liter soft drink container (plastic container code #1) and plastic milk jug (plastic container code #2)
 - Station 3—plastic-coated cardboard milk or juice container and plastic-coated cardboard juice boxes
- 5. Find out which materials are recycled in your community. (Contact the city or county recycling coordinator or the local garbage/recycling company.) Note that the materials that are recycled may vary from community to community. Materials that are being recycled may also change as new markets are developed or old markets become unavailable.
- 6. Contact the waste management or recycling office in your area for a directory of recyclers in the community. Ask the recycling coordinators whether they have lists of recyclers and other information on solid waste and, if so, would they send enough sets of information for your class so that each student’s family can be provided with a copy. This allows families without recycling programs in

their communities to find drop-off centers for their recyclables and learn more about how to reduce the amount of solid waste going to the landfill.

- 7. Consider using several students from upper-grade levels to help the younger ones at each station.
- 8. Make a copy of the homework assignment, “Some Are Made of Steel and Some of Aluminum” for each student (page 73).

MATERIALS

- Butcher paper on which to record students’ responses
- The book, *Where Does the Garbage Go?* by Paul Showers
- Magnets (one for each pair of students plus one for “Station #2”) (These can be bar magnets or even refrigerator magnets.)
- Examples of metals, including a washer (steel), aluminum foil, penny (copper), nail (iron)
- A plastic milk jug (The plastic code found on the bottom of the container should indicate #2.)
- A 2-liter soft drink container (The plastic code found on the bottom of the container should indicate #1.)
- An aluminum soft drink can
- A metal soup can (steel)
- A plastic-coated cardboard milk or juice carton
- A juice box
- Three copies of the “Station Investigation Sheet” (for stations 1, 2, and 3) for each pair of students
- A copy of the homework assignment, “Some Are Made of Steel and Some of Aluminum,” for each student

PRE-ACTIVITY QUESTIONS

Ask students:

- How many of you help your families shop for groceries?
- How do we choose what we buy?
- If you were going to help your family decide

the kinds of drinks they were going to buy, what would you consider? (Students might not be able to answer this question at this time. Ask them to remember this question so they can answer it at the end of the lesson.)

- What are some of the different kinds of drink containers that you can think of? *Aluminum can, glass bottle, plastic bottle, cardboard and plastic box.* List these on butcher paper so the list can be referred to in other lessons. Which of those containers do you think can be recycled? Circle those listed.
- What do you recycle at home? Make a list on the butcher paper.

PROCEDURE

- A. Explain to students that today they will become drink container experts. At different learning stations, they are going to learn about different kinds of drink containers. Because they will be using magnets at one of the stations, they will first learn to use magnets.

1. Ask them whether they know what a magnet is. *Something that sticks to metal; a decoration on the refrigerator; a black piece of metal.*
2. Once students have established that magnets attract some metals, show them the various metals you have collected for this lesson. See whether students can identify what kinds of metal each item contains. *Steel (washer), iron (nail), aluminum (foil), copper (penny).*
3. Have students determine whether a magnet will attract all the metals you have shown them.
 - Provide magnets and the various metals and have students test each metal. Allow students an opportunity to do some free exploration with magnets and items in the classroom.

Note: Make certain to keep magnets away from computer disks, as the disk's contents could be erased.

- After students have had sufficient time to draw conclusions on their own, bring them together as a group to discuss their findings. Students should conclude that a magnet attracts only steel and iron. Introduce the words *ferrous metals*. (These are

metals which contain iron and are therefore attracted to magnets.)

- B. Tell the students that they will go in groups, but will stay with their partners, and visit three different stations to examine containers that hold things they drink and determine what these containers are made of. They will record their answers on their investigation sheets.

Note: For younger students consider doing one station per day. Then on the last day, the charts can be reviewed. Also, younger students can test the materials, and the chart can be completed as a class.

- C. As you explain each station, walk to the station and hold up the beverage containers.
1. Explain to students that at "Station #1, Metal Cans," they will test two kinds of cans to see whether they are "magnetic." Tell them that some cans are made from ferrous metal and are attracted to magnets. Other cans are made from metal that is not attracted to magnets. Students will test the sides and the top and bottom of each can for magnetism and will record their answers on their investigation sheets.
 2. Explain to students that at "Station #2, Plastic Containers," they will examine a 2-liter plastic soft drink container and a plastic milk jug. They will be looking at the color of these plastic containers and the plastic container number found on the bottom of each container. They will be recording the information on their investigation sheets.

Note: Students may have already had experiences in sorting plastics if they completed Lesson 1 in this unit.

3. Tell students that they will also be looking at two plastic-coated cardboard containers, one for milk and one for juice at "Station #3, Plastic Coated Containers." They will record on their investigation sheets their answers to the questions on the card for this station.
- D. Provide an investigation sheet for each pair of students. Separate the class into three groups. Ask the groups to rotate

through the stations and to complete their investigation sheets with a partner.

Note: If you can get the help of students from upper-grade levels, have them help the younger ones at each station.

DISCUSSION/QUESTIONS

Place the various beverage containers in front of the class.

- A. Ask students what they discovered at “Station #1, Metal Cans.”
- Do they think that both of these cans can be recycled? *Yes.*
 - Tell them that some recyclers want aluminum cans separated from metal cans at the curbside. Other recyclers collect all cans together and separate them with large magnets at the recycling site. Also, some cans are separated on a conveyor belt by people working in a materials recovery facility (MRF). By separating the metals, recyclers can ensure that aluminum cans will be recycled into new aluminum products and steel cans will be recycled into new steel products.
 - Discuss ways that students can reuse cans. Generate a list and post it in the classroom. Students can illustrate each use and add new uses. (See “Resources” for books containing additional ideas on reusing cans.)

Note: If you have completed Lesson 1 in this unit, the following section will be a review for your students.

- B. Ask how the containers in “Station #2, Plastic Containers” differ from each other. *The plastic with the plastic container code number 1 is clear, and the plastic with the plastic container code number 2 is milky in color.* Note that there are plastic containers with the code number 2 which are unpigmented (e.g., milk and water jugs) and those that are pigmented (e.g., orange juice containers). You might bring (or ask a student to bring) to class a pigmented plastic container with code number 2 for students to see.
- Tell students that most plastic containers have a number inside a triangle embossed on the bottom of the containers. This is called the plastic con-

tainer code or plastic resin code. What did they find? *The 2-liter soft drink bottle was number 1, and the plastic milk jug was number 2.*

- After reviewing the list of plastics recycled in your community, determine which plastics can be recycled in your area.
 - Explain that each number on a plastic container indicates the resin type, and for recycling purposes these cannot be mixed. Usually, plastic containers marked with plastic container number 1 and number 2, which are unpigmented (have no color), are commonly recycled. Other plastics (usually not used for beverage containers) are sometimes recycled. All plastics are not being recycled, because markets for certain recycled plastics have not yet been developed.
 - Explain that when plastic is recycled, the following happens:
 - a. The containers are sorted by their resin types.
 - b. The plastic is cut into tiny pieces (called pellets).
 - c. The pellets are melted.
 - d. The melted plastic is reshaped into new plastic objects.
 - Ask students what natural resource is conserved when plastic is recycled. *Petroleum is conserved, because it is not used to make new plastic.* However, students should be aware that natural resources are still being used to transport the plastics and to cut and melt them.
 - Ask students how reusing plastic containers can conserve natural resources even more than recycling them. Lead students to say that when plastics are reused, they do not need to be transported and reprocessed. Discuss ways that students can reuse the plastic containers. Generate a list and post it in the classroom. Students can illustrate each use and add new uses.
- C. Take apart the juice box and/or milk carton to show the layers.

- Ask students whether they think that plastic-coated cardboard containers can be recycled. Ask them why they believe that these containers can be recycled or cannot be recycled.
- After collecting their answers, explain that at this time we have the technology to recycle these containers, but it is not always feasible. The plastic coating on the cardboard prevents it from being mixed with plain cardboard and, therefore, requires a special process to retrieve the high quality paper that is used in juice boxes and milk cartons. Only certain reprocessing facilities have the technology to recycle plastic-coated cardboard. There are only a few of these facilities in California, which means that these materials have to be transported long distances to reach the reprocessing facilities. If the transportation expense exceeds the benefit of recycling, these containers are thrown in the waste container. Then they go to an incinerator (where they are burned) or to a landfill (where they are buried).

Homework Assignment: Have students select a container made from one of the following materials: plastic, aluminum, steel, plastic coated (e.g., juice box). Ask students to list and/or draw three ways that the container they selected could be reused.

- D. Discuss with students:
- Of the containers that we investigated, which are reusable? *All of them could be reused.*
 - Which containers are recyclable? *Aluminum, metals, some plastic, and possibly juice boxes and milk cartons.* (This will depend on what is recyclable in your community.)
 - Which drinks seem to have better packaging, and what is considered “better” and why? *Packaging that has less to throw away or is reusable or recyclable could be considered better because natural resources are conserved.*
- E. Ask students to share their homework assignments.

APPLICATION

- A. Ask students to look at the list of drink containers listed at the beginning of this lesson on butcher paper. Have different students select one container and tell the class what it is made of and whether it can be recycled in their community. Make sure everyone has a turn. Another way to do this is to write the following on the chalkboard:

- A—steel
- B—plastic
- C—plastic and cardboard
- D—aluminum

Then say a letter; e.g., “B.” A student reads the word “plastic” and selects a container that is made from plastic. Then the student tells the class whether this container can be recycled in their community.

Play the same game, except have students describe one way each item can be reused.

- B. Show students the illustrations on pages 24–27 in the book, *Where Does the Garbage Go?* by Paul Showers, which shows how different materials are recycled. Students can make their own large illustrations on ways materials get recycled.
- C. Ask students to complete the following sentence in their journals: I used to throw away _____ but now I _____ (don’t buy it; don’t use it; reuse it; recycle it). Students can also illustrate what their sentences represent.
- D. Ask students to share their journal entries.
- Homework Assignment:** Distribute the homework assignment, “Some Are Made of Steel and Some of Aluminum.” Ask students to look in a newspaper advertisement section or Sunday’s edition coupon section and cut out ads that show steel and aluminum cans. They should then glue pictures in the appropriate section of the homework assignment sheet.
- E. Ask students to share their responses to the homework assignments.
- F. Ask students:
- If you were going to help your family decide what kinds of drinks to buy, what might you consider? *Whether the containers can be recycled in our community.*

- What could you tell your parents or relatives that might make them buy reusable and recyclable containers?

Project Idea: Have students decorate cardboard boxes for gathering items that can be reused in the classroom and those that can be recycled. They should clearly mark these. Students can also decorate cardboard boxes to give to other classes.

EXTENSIONS

- Have students put their nonfood snack or lunch trash in garbage bags for several days. Then have the class identify which trash is recyclable or reusable and which needs to be taken to the landfill.
- Have students write or draw containers they currently use and describe or draw options for reusing and recycling these containers. Have students discuss their drawings with a partner and then share them with the class. These recommendations can be shared with their families.
- Have students determine whether they can cut down on the waste created if they buy things in larger containers. Compare six 6-ounce juice bottles to a 36-ounce juice bottle. Drink the juice and compare the number and weight of the containers.
- Have your community's recycling coordinator come in to speak to your students about how to recycle. Other materials besides plastic, glass, and metal can be discussed (e.g., newspaper, cardboard, paperboard cereal/cracker boxes, glass).

RESOURCES

Videos

Garbage Tale—An Environmental Adventure. Los Angeles, Calif.: Churchill Media, 1990 (18½ minutes).

In a dream, Ernie is taken to discover where his garbage goes. He travels to landfills, incinerators, compost bins, and recycling centers. He learns about reducing, reusing, and recycling.

Recycle That Trash. Santa Monica, Calif.: Pyramid Film and Video, 1990 (18 minutes).

A class visits a landfill, a transfer station, and a recycling center and begins recycling programs at home.

Recycling Is Fun. Oley, Penn.: Bullfrog Films, 1991 (12 minutes).

Three children visit a landfill, a recycling center, and a supermarket to determine what they can do to reduce, reuse, and recycle.

Recycling: It's Everybody's Job. Washington, D.C.: National Geographic, 1992 (20 minutes).

For a class project, students sort through and separate family garbage to learn why recycling can be part of a solution to the solid waste problem.

Books

Albert, Toni. *Hands-on Recycling* (Grades 1–2). Greensboro, N.C.: Carson-Dellosa Publishing Co., Inc., 1991.

Contains activities about recycling.

Gibbons, Gail. *Recycle! A Handbook for Kids.* New York: Little, Brown and Company, 1992.

Explains the problem of too much garbage and what can be done to reduce the amount of garbage going into our landfills. For young readers.

Kalbacken, Joan, and Emilie U. Lepthien. *Recycling.* New True Book series. Chicago, Ill.: Children's Press, Inc., 1991.

Describes, in simple text, how and what to recycle.

Showers, Paul. *Where Does the Garbage Go?* Let's-Read-and-Find-Out Science series. New York: HarperCollins Children's Books, 1994.

Describes landfills and how materials can be recycled into new products.

BEVERAGE CONTAINERS STATION TASK CARDS**Station #1: Metal Cans**

Test the magnetic attraction for each can.

- Place the magnet on the top, bottom, and sides of each can.
- Record on your investigation sheet what you found out.
- Do you think each container can be recycled?

Station #2: Plastic Containers

Look at the plastic containers.

- How are they different?
- Can you find a number on the bottom of the container?
- Record on your investigation sheet what you found out.
- Do you think each container can be recycled?

Station #3: Plastic-Coated Containers

Look at the plastic-coated containers.

- How are they different and how are they alike?
- Do you think each container can be recycled?

STATION INVESTIGATION SHEET

STATION #1 – METAL CANS

Names: _____

Date: _____

Metal Cans*	Can #1	Can #2
A. Does a magnet stick to the: Top?	Yes No	Yes No
Bottom?	Yes No	Yes No
Sides?	Yes No	Yes No
B. Can it be recycled?	Yes No	Yes No
C. What is it?		

*Circle your answer to each question.

STATION INVESTIGATION SHEET

STATION #2 – PLASTIC CONTAINERS

Names: _____

Date: _____

Plastic Containers*	Plastic 1 bottle	Plastic 2 jug
A. Is it clear or milky?	Clear Milky	Clear Milky
B. What number is on the container?	1 2	1 2
C. Can it be recycled?	Yes No	Yes No

*Circle your answer to each question.

STATION INVESTIGATION SHEET

STATION #3 – PLASTIC-COATED CONTAINERS

Names: _____

Date: _____

1. How are the two containers different?

2. How are they the same?

3. Do you think they can be recycled? Why or why not?

Homework Assignment

SOME ARE MADE OF STEEL AND
SOME OF ALUMINUM

Look in a newspaper advertisement section or in the coupon section of Sunday's edition and cut out ads that show steel and aluminum cans. Glue pictures

Steel Cans	Aluminum Cans

BACKGROUND INFORMATION FOR THE TEACHER

in the proper section below.

Students may be recycling at home if their community has a curbside recycling program. Other students may have parents who are committed enough to recycling that even though there is no curbside program in place, they take recyclables to a “drop-off” center. Some rural communities have no recycling opportunities. Students from those communities can be encouraged to select containers that can be reused. Beverage containers for milk, juice, and soft drinks are familiar to children and are, therefore, a simple and effective means for introducing reusing and recycling.

In this lesson students will be testing some beverage containers to see whether they attract a magnet. Note that steel is magnetic, but aluminum is not. However, some bimetal aluminum beverage cans may have a steel body and aluminum tops and bottoms. For more information on aluminum and ferrous metals, see “Appendix C–I, Aluminum,” and “Appendix C–III, Ferrous Metals.”

The coding system for marking plastics is described in Lesson 1 of this unit. The resin number identification code is stamped on the bottom of plastic containers in a small triangle or printed on plastic bags. Usually, only the plastic with the code number 1 (PETE bottles) and the unpigmented plastic with the code number 2 (HDPE) are recycled into new products, because manufacturing companies have not yet come up with products (at least on a large scale) made from other types of plastics.

Once reusables and recyclables are identified, the teacher can also introduce the question of what to do about containers that are not reusable or recyclable in their community. Currently, they must be disposed with waste that is either incinerated or placed in landfills. Since both of these choices waste resources, teachers can discuss with students what else could be done to eliminate these containers from the waste stream, or to prevent waste from being generated in the first place.

This discussion will lead to the idea of “choice” when buying products. In order to make a wise choice, students should be aware of the materials which can be reused or recycled in their community. From the standpoint of waste reduction, purchasing milk in returnable glass bottles is ideal, but these bottles are usually not available at

all grocery stores. The next preferable container in which to purchase milk would be whatever container is recycled in your community, which could be the plastic container code number 2 jug (HDPE) or the plastic-coated cardboard milk carton. In most communities, the plastic jugs are more likely to be recycled, and the milk cartons are least likely to be recycled. Students can encourage the collection and recycling of containers by contacting their local haulers and city or county recycling coordinators.

As a result of this lesson, students could become wiser consumers, and they can help educate their parents and relatives about the best choices to make at the store to help reduce solid waste and conserve natural resources.

Picture intentionally deleted.

Children at the Solar Community Housing Association Homestead CO-OP check a steel can to see whether it is attracted to a magnet.

LESSON 3: Classroom Exchange of Unwanted Items

LESSON'S CONCEPT

"Some materials can be used over again." (*Benchmarks for Science Literacy*, page 188)

PURPOSE

Students will demonstrate the importance of reducing solid waste by exchanging with their classmates those items they no longer want with items they can use.

OVERVIEW

Students bring to class items (e.g., books, clean toys, laundered clothing) that they or their family members no longer want and exchange them for other items that they do want.

Note: As an alternate activity, a book-only exchange could be organized. (See "Examples of Letters to Parents from Teachers," a letter submitted by Anne Harris, at the end of this lesson.) Another option is to exchange classroom materials with one or more classes. The students select items no longer needed in the classroom and exchange them for other items not needed by another class.

Note: Although some specific instructions are provided, this lesson can be used as a project-based learning experience for your class. To do this, students would generate the ideas for this exchange of unwanted items and design a plan for implementation. Students should be responsible for implementing all parts of this event. After the event, they should discuss what went well and what they would do differently next time and why.

CORRELATIONS TO CALIFORNIA'S CONTENT STANDARDS AND FRAMEWORKS AND TO BENCHMARKS FOR SCIENCE LITERACY

- Students demonstrate how items can be reused by organizing an exchange of unwanted items.
 - "Some materials can be used over again." (*Benchmarks for Science Literacy*, page 188)

- "Students must understand the basic economic problems confronting all societies." (page 17) "To participate effectively in society, students need to: Develop personal skills . . . group interaction skills . . . (and) social and political participation skills." (page 24) (*History-Social Science Framework*).
- "Students collect information about objects and events in their environment." (*Mathematics Content Standards for California Public Schools, Kindergarten Through Grade Twelve*, page 3)
- Students draw pictures of one or two items they have at home that they could reuse or give to someone else and describe the item's new use or identify the person they could give it to and explain why.
 - "Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept . . . students will: draw pictures that portray some features of the thing being described." (*Science Content Standards, Grades K-12; Grade 1; Investigation and Experimentation*, Standard 4a)
- Students develop categories for the items brought in to be exchanged based on natural resources used.
 - "Students sort and classify objects." (*English-Language Arts Content Standards for California Public Schools, Kindergarten Through Grade Twelve*, page 2)

SCIENTIFIC THINKING PROCESSES

observing, communicating

TIME

45–60 minutes to organize the exchange; 60 minutes for the exchange and follow-up

VOCABULARY

reuse

PREPARATION

- 1. Read the “Background Information for the Teacher” at the end of this lesson.
- 2. Design and send with students parent permission slips to allow students to bring to school specific items for the exchange. Make certain to establish clear guidelines concerning what is acceptable to bring to class (e.g., no toy guns, or toys that could cause injury, such as sling shots). Older students could write their own letter to their parent or guardian. See example below. Also, see the example of a letter from Anne Harris and Mr. Schut on page 79.

Note: You might want to have students bring items to class in advance of the exchange. Then if some students were not able to participate, you could come up with alternatives, such as bringing some extra items to class.

MATERIALS

- A couple of used items that would be attractive to your students (e.g., a ball, book, pen)

Optional

- A hat that could be used as an auctioneer’s hat

The additional materials that will be required will depend on the approach selected for this activity.

PRE-ACTIVITY QUESTIONS

- A. Stand in front of the class with a couple of used items that would be attractive to your students.
 - Announce that you are from Earth Savers’ Exchange and Premier Auctioneers.
 - Put on your auctioneer’s hat and start an enthusiastic round of bidding, pitching heavily on the value of these items.
 - Describe to the class how an auction works and explain the bidding process.
 - Tell them that you are hoping to have an exchange extravaganza in the classroom and you need their help.
- B. Ask students the following questions with all the bravado of an auctioneer still ringing in the air:
 - Can any of you remember a time when a friend or your older brother or sister gave you clothing or a toy or something else that was not new that you loved having?
 - What was it?
 - Have you ever thrown something away that maybe someone else could have used? (To make students more comfortable about sharing this information, give an example from your own life.) This lesson will allow you to exchange an item you no longer want or

(Use school’s letterhead.)

Dear Parent or Guardian,

Please read the following information with your child:

As part of our study of reusing and recycling items no longer needed, we are planning an exchange of items in our class. Please help your child select one or two items that he or she no longer needs or wants, but something that another child might want. Toys should be washed and items of clothing should be laundered. Please do not allow your child to bring any item which might cause injury to others (e.g., sling shots, archery set). The item or items for the exchange should be brought to school by _____. If you have any questions, please call me at _____.

Thank you,

need for an item that someone else will bring to class.

- How is throwing away things that could be reused considered “a waste”?
 - What are some things you no longer use or want that someone else could use?
 - What are some everyday events and organizations that facilitate the reuse of old items? *Garage sales, flea markets, secondhand stores, Goodwill, Salvation Army, Purple Heart.*
- C. List with students ways in which people are already finding new uses for old materials (e.g., making patchwork quilts out of scrap clothing, making pencil holders out of cans, making bird feeders from milk cartons, creating works of art from paper scraps or sculptures from metal and other materials).

PROCEDURE

- A. Discuss with students how to select items to bring. Make certain to establish clear guidelines concerning what is acceptable to bring to class (e.g., no toy guns, or toys that could cause injury, such as sling shots). Also, students should understand that whatever they bring to class to give away should be something they really do not want anymore.
- B. Determine how the exchange will take place. It is important to establish some basic parameters for what is acceptable at the exchange, as defined by students. Listed below are some questions to consider:
1. How could parental permission for an exchange of items be managed? (Students could draft an official exchange form with a sign-off blank for parents.)
 2. What should be the most and least number of items that a student can bring to the exchange? Students might also want to discuss a size limit for the items, as they will be bringing them to school.
 3. What will be the parameters of exchange; i.e., what is acceptable to bring in? How can you ensure that this exchange will not be just be a “dumping ground”? Should there be a “quality control” position, consisting of two or three students who decide whether an item is exchangeable or not? If so, the

class should design a list of criteria that each item must fit before it can be accepted into the exchange.

4. What will be the “rate of exchange”? Is it appropriate to have an appraisal; e.g., a number of points given to each item? Or should the exchange rate be one item for one item?
 5. Can students donate items without taking something?
 6. What should be done with items that are not exchanged (e.g., the unselected items would be taken back by students bringing them or, when appropriate, taken to a secondhand store or a children’s home).
 7. Should we advertise our items? Students can be encouraged to develop an advertisement or slogan for their items. The donations could also be anonymous, and students could select an item (that is not one they brought) to advertise.
- C. On the day of the exchange, fill the atmosphere with lots of auctioneer hoopla. Hold up different items and pitch their value. See what the class thinks the items are worth. After displaying lots of items and advertising their worth, proceed with whatever kind of exchange your class has designed.
- D. Have students calculate how many items did not go to the landfill as a result of this event. They can design a chart to show this.

DISCUSSION/QUESTIONS

Put on the auctioneer’s hat again and fill the air with excitement. “Well ladies and gentleman, boys and girls, what did you think of our exchange? What was the thing about it that impressed you the most? Here at Earth Savers’ Exchange and Premier Auctioneers we are always trying to find better ways to meet the needs of our customers. Could you please help us by answering the following questions?”

- Why is reusing an item a good idea? *It won’t go to a landfill; it saves natural resources.*
- What natural resources did you conserve by giving the items away instead of throwing them away? *Plants, minerals, fossil fuels.* Students can make a chart.
- Are new things always better than used things? Are new products always better than

older models? Why? How?

- Should we do this again? If so, what changes should we make to improve the waste exchange?

APPLICATION

- A. Ask students to identify one or two items at home which they can reuse or give to someone else. In their journals they should draw and describe their items and their new use or identify the potential recipients (who would not throw the items away) and describe why they selected these students.



Submitted by Debby Carter's first-grade class at Coyote Valley Elementary School, Middletown Unified School District.

- B. Have students develop categories for the items brought in to be exchanged, based on natural resources used. (This is especially valuable if students have participated in lessons from the K-3 Module, Unit 1, on natural resources.)

Project Idea: Reuse paper and other materials in the classroom. Have boxes of scrap paper available for various projects. Make books or journals about recycling out of discarded wallpaper ends (for covers) and rolls of paper (for pages inside the covers). Wallpaper companies, newspaper offices, and printing shops are good sources for these materials.

VARIATIONS

- A. Have students weigh each item and determine the total weight of items that did not go to the landfill as a result of this event.
- B. Have students write about or describe verbally the attributes of the item they brought in. Students can also explain the reasons why they want another item and what they plan to do with it. For younger students

these descriptions can be recorded on a tape recorder or narrated to an older student, who can write the information down.

- C. Organize a reusable items drive and donate the things collected to an organization selected by students.
- D. Have students develop classroom currency. Have students earn the currency for the auction.

EXTENSIONS

- A. Invite someone from a thrift store or charitable organization that operates a second-hand store to visit your class. Ask students to prepare questions.
- B. Have students do the exchange of unwanted items with other classes.
- C. Assign students to publish a special barter want ad. Put in requests for items for which they are looking; e.g., willing to exchange item "X" for item "Y."
- D. Introduce students to the CIWMB's CALMAX and KidMAX programs. CALMAX is a materials exchange program that promotes the reuse and recycling of businesses' excess products, materials, and discards. A bimonthly catalog lists materials available and materials wanted. Any business, nonprofit group, or government entity may list, at no charge, materials it has available or materials it needs. KidMAX supplements CALMAX by offering a materials exchange specifically targeting California schools. More information is available at: California Integrated Waste Management Board's CalMAX, MS-14, 1001 I Street, P.O. Box 4025 (mailing address), Sacramento, CA 95812-4025.

www.ciwmb.ca.gov/CalMAX/kidmax.htm
(KidMAX)

www.ciwmb.ca.gov/CalMAX/
(CalMAX)

RESOURCES

Videos

It All Adds Up (Waste/Pollution). The Outside Story with Slim Goodbody series. Produced by

the Agency for Instructional Technology (AIT) and the Slim Goodbody Corporation, 1991. Bloomington, Ind.: Agency for Instructional Technology (AIT) (distributor) (15 minutes).

Stresses the importance of dealing with waste responsibly and shows various ways in which humans dispose of waste. Encourages students to reduce, reuse, and recycle much of the waste they create.

Kids Talkin' Trash. Alameda County Waste Management Authority, 1995. Distributed by the California Integrated Waste Management Board (14 minutes).

The video shows students putting on a Recycle Art Fair.

Recycling: It's Everybody's Job. Washington, D.C.: National Geographic Society, 1992 (20 minutes).

For a class project, students sort through and

separate family garbage to learn why recycling can be part of a solution to our solid waste problem.

Books

Brown, Laurie Krasny, and Marc Brown. *Dinosaurs to the Rescue.* New York: Little Brown and Company, 1992.

Dinosaur characters introduce some environmental problems and suggest ways children can help. Includes a section on exchanging items or giving them away.

Williams, Karen Lynn. *Galimoto.* Illustrated by Catherine Stock. New York: William Morrow and Company, Inc., 1990.

A boy collects pieces of wire to make a toy.

When it comes to responsible waste management, recycling has gotten all the press. Yet, in profes-

EXAMPLES OF LETTERS TO PARENTS FROM TEACHERS

Dear Parents or Guardians:

Tomorrow is our book exchange. The students and I have decided on some guidelines for the books. Books should have:

- Both covers
- All pages
- No writing, stamps, or stickers
- No stains
- No tears
- Not be falling apart

Students are to bring one or two books they would like to exchange. They may donate books without taking another. Leftover books will go into the book box.

Students decided that we should have a parent permission form. Please return the permission slip below to school tomorrow with the books to be exchanged.

Thanks,
Miss Harris

I give permission for _____ to exchange the
following book(s) _____

Parent's signature _____

Submitted by Anne Harris, second-grade teacher, Jefferson Elementary School, Cloverdale Unified School District.

Dear Parents,

Part of the unit I am teaching on waste uses the slogan "Reduce, Reuse, Recycle, and Rot." The students are confused about reuse. So, on Friday, I would like to have an exchange. I am asking each child to bring in one item (toy, book, stuffed animal, clothing, etc.) that (s)he would be willing to give up. We will call that the "used item." On Friday, everyone who brought in an item will get to exchange with a classmate for another item which will then be "reused" rather than put in the garbage. Your child will bring home only one item (don't worry).

Thank you for your cooperation,
Ted Schut

Submitted by Ted Schut, first-grade teacher, Ripona Elementary School, Ripon Unified School District.

BACKGROUND INFORMATION FOR THE TEACHER

sional circles, recycling ranks second on the list of environmentally friendly options. What method tops the charts? It is the time-honored but recently neglected practice of waste prevention, also referred to as “source reduction” or reducing and reusing.

In its report entitled *The Solid Waste Dilemma: An Agenda for Action* (1989), the U.S. Environmental Protection Agency (EPA) listed both reducing and reusing ahead of recycling in its hierarchy of waste management techniques. The rationale for such a prioritization is simple. Garbage that never gets produced will never have to be disposed of. Reducing and reusing also eliminates the need for handling and transporting materials, making it cheaper than other options. In addition, neither reducing nor reusing necessitates the energy-intensive remanufacturing step, which is required in recycling.

Practiced for years by the local milkman, reuse went out of style in the years following World War II. However, the idea has by no means disappeared. Every time we go to the grocery store, we reuse a shopping cart to gather our selections. Every time we bring our own grocery bags to a grocery store, we are reducing our use of paper or plastic grocery bags. Every time we purchase a refillable bottle, we participate in a well-organized system of reuse. There are dozens of other ways that we can reduce the amount we use and give common discards a second life. All that is required is an awareness of the possibilities, a gradual rejection of the “disposable” ethic, and persuasion of manufacturers to make fewer disposable and more reusable products. For more information on waste prevention, see “Appendix B–II, Waste Prevention.”



A book exchange event at Louisiana Schnell Elementary School, Placerville Union School District. Photograph submitted by Becky Williams from the California Integrated Waste Management Board.

LESSON 4: Making Recycled Paper by Hand

LESSON'S CONCEPTS

- Waste paper can be made into recycled paper in order to conserve trees and space in landfills.
- Buying products made from recycled materials continues a cycle that conserves natural resources.

PURPOSE

Students will learn how to make recycled paper. Students will also identify how buying recycled products “closes the loop.”

OVERVIEW

In this lesson students will:

- Listen to descriptions and conclude that most paper is made from trees.
- Observe various types of paper with a magnifying lens.
- Use various steps involved in recycling wastepaper by making their own recycled paper in the classroom.
- Make planters out of recycled paper and plant seeds or seedlings.
- Look for the symbol on products that indicates the product is made from recycled material.
- Discuss how “closing the loop” benefits the environment and people.

CORRELATIONS TO CALIFORNIA'S CONTENT STANDARDS AND FRAMEWORKS AND TO BENCHMARKS FOR SCIENCE LITERACY

- Students compare similarities and differences in types of paper, including those made from recycled fibers, after they observe these with a magnifying lens.
 - “Magnifiers help people see things they could not see without them.” (*Benchmarks for Science Literacy*, page 111)
- Students work in groups to make recycled paper. They read directions.
 - “Many materials can be recycled and

used again, sometimes in different forms.” (*Benchmarks for Science Literacy*, page 119)

- “Several steps are usually involved in making things.” (*Benchmarks for Science Literacy*, page 188)
- “To participate effectively in society, students need to: Develop personal skills . . . group interaction skills . . . (and) social and political participation skills.” (*History–Social Science Framework*, page 24)
- “Students know about letters, words, and sounds. They apply this knowledge to read simple sentences.” (*English–Language Arts Content Standards for California Public Schools, Kindergarten Through Grade Twelve*, page 1)
- “Students create original artworks based on personal experiences or responses.” (*Visual and Performing Arts Framework; Visual Art: Creative Expression Component*, Goal 4, page 101)
- Students draw and write descriptions of how to make recycled paper.
 - “Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept . . . students will: draw pictures that portray some features of the thing being described.” (*Science Content Standards, Grades K–12; Grade 1; Investigation and Experimentation*, Standard 4a)
 - “. . . write or draw descriptions of a sequence of steps, events, and observations.” (*Science Content Standards, Grades K–12; Grade 2; Investigation and Experimentation*, Standard 4d)

SCIENTIFIC THINKING PROCESSES

observing, communicating, comparing, ordering

TIME

60 minutes to prepare for the lesson and to prepare the paper pulp; 45–60 minutes per day for two days to implement the lesson,

plus 30 minutes three days later (or whenever the recycled paper in the planter is dry) to plant the seeds

VOCABULARY

“closing the loop,” conserve, pulp, pulp slurry, virgin paper

PREPARATION

Note: It is recommended that only “Part I-A, Making a Paper Planter” be completed by students in kindergarten and grade one; and both “Part I-A, Making a Paper Planter” and “Part I-B, Making Recycled Paper” be completed with students in grades two and three.

- 1. Read the “Background Information for the Teacher” at the end of this lesson.
- 2. The day before you plan to do this lesson, have each student prepare to make a paper planter by tearing two full pages of newspaper into one-half to one inch pieces. Fill buckets or pans with one part newspaper pieces and three parts water. Let the mixture sit overnight. The newspaper pieces will be soft and ready to be pulped the next morning.

Note: By soaking the mixture overnight, a blender will not be needed for making the paper planter. Then the blender can be used solely for the activity of making recycled paper. For younger students (in kindergarten and first grade), a blender will not be necessary, and you will not need to complete “Preparation” #2 and 3.

- 3. Either make one transparency of, or make a copy and consider laminating, “Steps to Make Recycled Paper” (pages 88–89). (If you are using two blenders, you will need to make two copies of the “Steps.”)
- 4. Make a transparency of “Closing the Loop: The Meaning of Recycling Symbols” (page 90).
- 5. Obtain enough window screen to cut several rectangles, approximately 8 inches by 10 inches. Most hardware stores will donate pieces of old screen. You can

also buy a roll and share with other teachers. (Larger or smaller sizes of screen can also be used.) Place duct tape around the cut screen to cover rough edges and to make the edges stiffer. If you have access to half-inch wood strips to use for framing the screen, staple the screen onto the wood.

MATERIALS

For “Pre-Activity Questions”

- The book *Be a Friend to Trees* by Patricia Lauber or a similar book that describes the fact that trees are cut and their wood pulp is used to make paper
- Sample of various paper, some of which is made from recycled fibers (for example: chipboard [cereal box], made from recycled fibers; magazine (coated with clay); newsprint (most newspapers will note their paper has recycled content); white office paper (if available, obtain some made from recycled fibers); construction paper (Also if available, provide an example of recycled paper made by students.)
- Magnifying lens (one for each pair of students)
- If available, a microscope

For “Part I-A, Making a Paper Planter”

- Small milk cartons (6-ounce size), rinsed and top cut out; or yogurt containers, one for each student
- A few stacks of newspapers
- Seeds to plant in the paper planter (Some nurseries will donate seeds. Consider planting native wildflowers or radishes [that students could eat].)
- Approximately 1 cup of soil for each paper planter

For “Part I-B, Making Recycled Paper”

- ___ Several 8- by 10-inch pieces of window screen
- ___ Duct tape or wooden frames for each screen
- ___ Scissors
- ___ Two or more 2-gallon plastic dishpans
- ___ Two or more large slotted spoons (depending on the number of dishpans)
- ___ One or two blenders (To speed up the process, obtain a ratio of one blender for up to three plastic dishpans.)
- ___ A copy of “Steps to Make Recycled Paper” for each blender
- ___ Scraps of white and colored paper
- ___ Several towels or sponges (or additional newspaper for removing excess water)

Note: If students plan to write on their recycled paper, consider adding some liquid fabric starch to keep the ink from spreading.

Optional

- ___ An embroidery hoop, a wooden picture frame, large cookie cutters, and/or a coffee can (with both ends removed) to be used as frames for a screen
- ___ Leaves, flowers, potpourri, and/or food coloring (to add to the recycled paper that students are making)

For “Part II, Buying Recycled Products”

- ___ An example of the symbol that indicates that a product is made from recycled material from a cereal box or other product
- ___ The transparency, “Closing the Loop: The Meaning of Recycling Symbols”

Optional

- ___ The video, *Kids Talking Trash*
- ___ A video on how paper is made (See “Resources.”)

For “Application”

- ___ The book *Where Does the Garbage Go?* by Paul Showers

PRE-ACTIVITY QUESTIONS

- A. The day before making the paper planter, soak a mixture of newspaper and water overnight. (See “Preparation #1.”) Discuss what will happen to the newspaper that is soaked overnight. *The paper will break up; it will turn white; it will turn “mushy”; its ink will get in the water.*
- B. Read to students pages 5–10 and 30–32

from the book *Be a Friend to Trees* by Patricia Lauber (could be substituted by another book on the same topic). Discuss:

- From what material is most paper made? *Wood*. What category of natural resources is wood? *Plants*. (Students learned this in the K–3 Module, Unit 1.)
 - What are some other ways that plants are important? *They provide food and shelter to wildlife; people eat plants; people use wood from trees for lumber to build houses and furniture.*
 - Who and what depends on trees and other plants to survive? *People; wildlife.*
 - What can we do to conserve (use fewer or avoid wasteful use of) trees? *Use fewer things made from trees; reuse things made from trees; recycle things made from trees.*
- C. Provide samples of pieces of paper made from recycled fibers and from nonrecycled fibers (virgin materials).
 - Distribute magnifying lenses.
 - Have students examine the various types of paper with their magnifying lenses to identify similarities and differences.
 - If available, allow students to view paper fibers through a microscope.
 - D. Discuss with students:
 - What do you see when you look at the paper through a magnifying glass? *Bits of stuff; fibers.*
 - What differences did you see between paper made with recycled fibers and nonrecycled fibers? *You can see the recycled pieces in the recycled paper.*
 - How do you know if something is made from recycled materials? *It says so on the box.* (This information is usually printed on the box or container and includes the three-arrow symbol. See example in “Part II.”)
 - What insect makes paper? *The paper wasp.*

PROCEDURE

- A. For “Part I-A, Making a Paper Planter” and “Part I-B, Making Recycled Paper,” do the following:
 - Separate the class into groups of three or four students.

- Two groups will make recycled paper, while all other groups will be making paper planters.
- If you have two blenders, you can have four groups work on the recycled paper while the other groups work on their paper planters.
- Students who complete their planters can cut and/or tear scrap paper into a container while waiting their turn to make the recycled paper.

Part I-A, Making a Paper Planter

Note: The mixture for the paper planter was to be prepared the day before.

- B.** Provide newspapers (to be spread in the work area), a small milk carton (with the top cut) or yogurt container for each group.

Note: For younger students you will need to demonstrate how to make a paper planter.

1. Stir the pulp mixture (which has been soaking overnight) in each bucket or pan until it looks like mush. (Soaking and stirring breaks the fibers down into a form that can be bonded together again to form recycled paper.)
 2. Have students:
 - Take a handful of the pulp mixture. (They should squeeze as much water out of the pulp as possible back into the bucket or dishpan.)
 - Use dry pieces of newspaper to remove the excess water. (This step is very important, or the paper planter will take too long to dry.)
 - Use a small milk carton or other container and mold the pulp inside the carton. The pulp should be about $\frac{1}{4}$ inch thick.
 - Use additional pieces of newspaper to remove the excess water inside the paper mold.
 - C.** Allow the planters to dry completely (about three days) inside the carton. You might set these out in the sunlight for a few hours each day.
- Once the paper planters are dry:
- Take the handmade paper planters out of the milk cartons. The milk cartons can be reused or also used as planters.

Picture intentionally deleted.

Students from Lynda Mooney's first-grade class at Las Palmas Elementary School show their paper planter and paper made from recycled fibers.

- Provide soil and plant seeds in the planters. If the seeds are from native wildflowers, once they mature, students can take these home or plant them on the school grounds. If radish seeds were planted, students can wait until the radishes are large enough to eat. Then a salad that includes the radishes can be made for the whole class.

Note: When planting the seedlings, place the entire paper planter with the plant in the ground. The paper planter will decompose.

Project Idea: With the class, plant seedlings, shrubs, and/or wildflowers on the school campus or in a nearby park. The U.S. Forest Service, the California Department of Forestry, and some timber companies and nurseries will often donate to schools seedlings from native trees and other plants. If seedlings are to be planted on the school grounds or in other parts of the community, it is recommended that the species of the seedlings be appropriate for the existing soil and weather conditions where they will be planted. This will ensure a greater survival rate for the plants.

Part I-B, Making Recycled Paper

Note: For younger students, prepare the pulp slurry in advance. For safety reasons, do not allow younger students to work the blender.

Note: Use white and colored scrap paper to make colorful recycled paper. Adding potpourri

Picture intentionally deleted.

Students in Betsy Weiss's first-grade class at Paden Elementary School work in groups to make recycled paper.

(be careful not to use potpourri that has soap in the fragrances because it will make the pulp sudsy), spices, and/or flowers prior to blending the paper will give the recycled paper texture and scent. You can also use newspaper from which to make recycled paper; then add colored paper, streamers, food coloring, or berries to give you colored recycled paper, although the recycled paper will have a grayish hue.

- D. Set a copy of "Steps to Make Recycled Paper" by each blender. While the rest of the class members are molding their paper planters, teach the first two groups how to make a recycled sheet of paper. They should follow the directions on "Steps to Make Recycled Paper." (If you have two blenders, then teach four groups.) When students from the first two groups have completed making the paper, have them teach the students in the next two groups how to make the paper. Then the members of the first group can work on their paper planters. The second group will teach the third group and so on. (Again, if there are two blenders, you can have two groups teach two other groups.)

Note: Adding liquid fabric starch to the pulp will allow students to write in ink on the recycled paper without the ink spreading.

- E. Have students use a magnifying lens or microscope to examine the recycled paper that they made.

Note: Keep one paper planter and one milk carton to test for speed of decomposition in the K-3 Module, Unit 3.

Picture intentionally deleted.

Students from Ted Schut's first-grade class at Ripona Elementary School show the recycled paper that they had made.

Project Idea: Have students make cards (e.g., for Mother's Day or Father's Day, birthdays, notes) out of recycled paper to give as gifts. Some could be sold for fund-raising purposes.

Part II, Buying Recycled Products

- A. Show students an example of the symbol that indicates that a product is made from recycled material. Consider showing a section of the video *Kids Talking Trash* that explains how to read a package to determine whether it is made from recycled material.



- B. Project the transparency "Closing the Loop: The Meaning of Recycling Symbols" and ask students, "If you put paper in the recycling bin represented by the first arrow in the logo for recycled material, and the second arrow represents the making of new paper, what do you think the third arrow means?" *Buying products made from recycled paper.* (You will probably need to lead students through this thought process.)
- Ask:
 - How do you think this "closes the loop"? *The paper doesn't get thrown away into a landfill; it gets made into new paper.*

- How do we make certain we are “closing the loop”? *Reuse paper; then recycle it to be made into new paper; then buy products made from recycled materials.*

2. Explain that “closing the loop” is practicing all of the three activities depicted in the recycling loop (i.e., collecting, manufacturing, and buying recycled material). Without any one of those activities, the loop remains open. And if you are not buying recycled products, you are not completing the recycling process.

C. If available, show students a video, photographs, or books with photographs about manufacturing recycled paper.

Homework Assignment: Ask students to look on packaged items for the symbol that indicates that a product is made from recycled material. Then have them list or draw at least two products that contain the recycled content symbol to share with the class the following day. They can bring a box with the symbol or cut the symbol from the box. (**Safety Note:** Students should request the assistance of an adult to cut the symbol from the box.)

DISCUSSION/QUESTIONS

Discuss with students:

- What does the word *conserve* mean? *To keep from wasting; to save.*
- How does recycling paper conserve trees? *Fewer trees are needed to make paper because we are using and buying less paper.*
- How does recycling paper conserve landfill space? *Less paper goes into the landfill so it will take longer to fill up.* Inform students that, in California, paper makes up 31 percent of the residential (household) waste stream.
- How does buying or making recycled paper conserve trees and landfill space? *To make recycled paper, less tree pulp is used and less paper is being thrown into the landfill, because the paper is being recycled and used again.*
- Why is it important to buy products made from recycled materials? *Trees are conserved and so is landfill space.*

APPLICATION

A. Have students determine how the recycled paper they made could be used; e.g., as a

greeting card, for a sign. Then ask them to use the recycled paper they made for a specific purpose.

B. The following should be discussed with older students:

- Describe what “closing the loop” means. *Placing recyclable items into a bin for collection, having the manufacturing companies make new items with the recycled product, and buying recycled products.*
 - How does “closing the loop,” by buying recycled materials, conserve natural resources? *Fewer natural resources are needed to make things from recycled materials (e.g., recycled paper) than it takes when those same things are made from raw materials (e.g., tree pulp).*
 - How does “closing the loop” benefit people and the environment?
- C. As a class, make a list of the benefits of recycling paper and using recycled paper, and share the information with another class. Also list the benefits of reusing paper.
- D. Show students page 24 in the book *Where Does the Garbage Go?* by Paul Showers. Have students compare the papermaking steps they used with those used by the paper mills in the manufacture of recycled paper. Or have students use pictures, labels, and short phrases to create a poster describing the benefits of recycling paper.
- E. Ask students to draw and write descriptions of the sequence of steps of how to make recycled paper.

Project Idea: Encourage students to come up with ways to demonstrate that recycled paper (made from recycled paper fibers) can be as good as virgin paper (made from wood pulp). They can test for strength, color, absorption. Have students summarize their results in a chart. This chart can be used to encourage students, parents, and school staff to buy recycled products.

EXTENSIONS

A. For more sophisticated methods of making paper in the classroom, see chapters 4–10 in Arnold E. Grummer’s book *Paper by Kids*, as well as other references listed in the “Resources” section. You can assign groups of students to try some of the paper variations described in chapters 6–8 in *Paper by Kids*.

These include making decorative paper using thread, leaves, dried flower pieces, and dyes.

- B. Have students select colors of paper from which to make recycled paper and to predict the final color the color blends will produce.
- C. Allow the paper in the recycle bin to stack up for a week or two. Let the children guess how far the stack will grow. Mark their predictions on a chart. Repeat this activity throughout the year; make it a goal to reduce the size of the stack.
- D. Keep track of how many pounds of paper you recycle in the classroom in one month. Make a chart and post it beside your class's recycling bin. How many pounds of paper were saved? How many could the whole school save? (Each ton of paper replaces and preserves about 90 tons of wood from trees.)

Note: It is difficult to calculate the number of trees this represents, because the size and type of trees used for paper vary.

- E. Have a student conduct research on the paper wasp.
- F. Have students find information on the history of paper and make a report to the class. (See "Appendix C–VII, Paper.")

RESOURCES

Video

Recycling: The Endless Circle. Washington, D.C.: National Geographic, 1992 (25 minutes).

Explains how recycling returns used materials to make new products, therefore reducing waste. The processes involved in recycling paper, aluminum, and plastic are described.

Books

Brandt, Keith. *Discovering Trees*. Mahwah, N. J.: Troll Communications, 1982.

Describes the importance of trees.

Davis, Wendy. *From Tree to Paper*. Littleton, Mass.: Scholastic, 1995.

Describes the steps for manufacturing paper.

Grummer, Arnold E. *Paper by Kids*. Minneapolis, Minn.: Dillon Press, Inc., 1980.

Describes a variety of ways that children can make recycled paper.

Lauber, Patricia. *Be a Friend to Trees*. New York: HarperCollins Children's Books, 1994.

Describes the importance of trees (food and habitat for animals, oxygen), including ways trees are used by people (for wood, paper).

Showers, Paul. *Where Does the Garbage Go?*

Let's-Read-and-Find-Out Science series. New York: HarperCollins Children's Books, 1994.

Describes how materials can be recycled into new products.

Toale, Bernard. *The Art of Papermaking*. Worcester, Mass.: Davis Publications, 1983.

Describes various papermaking techniques.

Udry, Janice May. *A Tree Is Nice*. New York: Harper and Row, 1956.

Describes ways trees are important.

Weidenmuller, Ralf. *Papermaking: The Art and Craft of Handmade Paper*. Translated by John Kalish. San Diego, Calif.: International, 1984.

Describes various papermaking techniques.

Magazines

Powell, Jerry. "Hand Papermaking: Recycling Education at Its Best," *Resource Recycling* (Jan./Feb., 1989), 30–33 and 49.

This issue describes how to make recycled paper.

"The Story of Paper," *Kids F.A.C.E.*, Vol. 8, Issue 2 (February/March, 1997), 1 and 2. 1-800-952-3223; www.kidsface@mindspring.com

This issue describes how to make recycled paper.

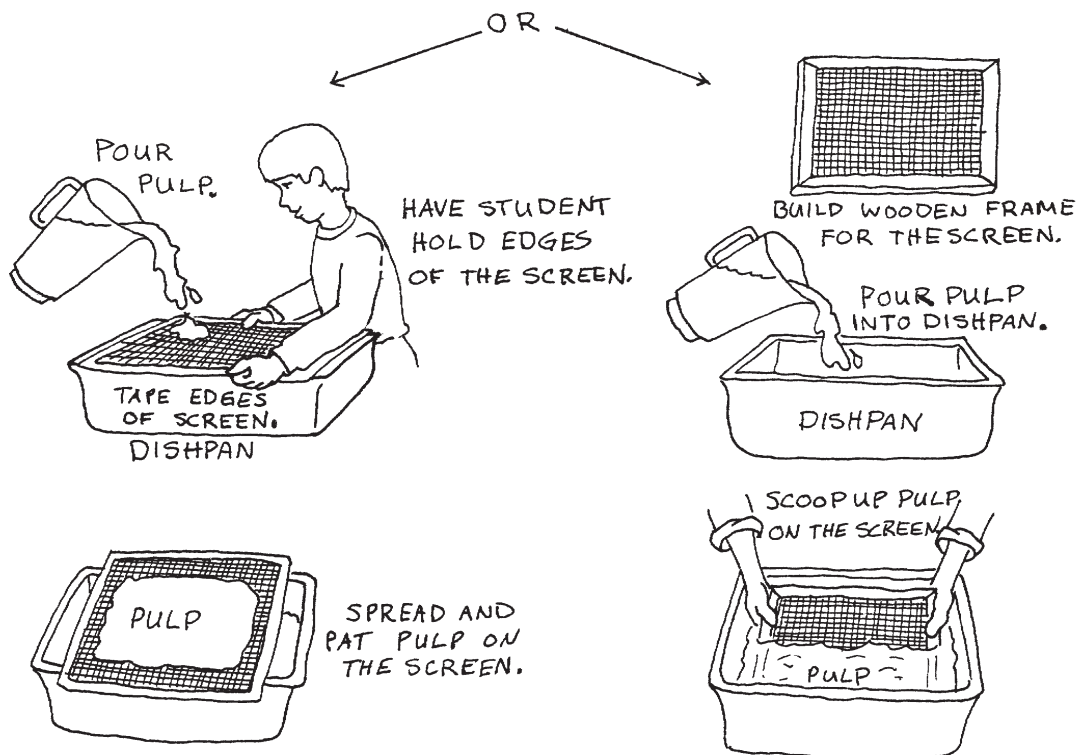
Web site

The Technical Association for the Pulp and Paper Industry (TAPPI) has information about paper and paper making. TAPPI's Web site is: www.tappi.org.

STEPS TO MAKE RECYCLED PAPER

1. Place torn up paper in a blender until the blender is half full.
2. Cover the paper with water. The ratio is usually one part paper to two parts water. If the paper is not blending easily, you may need to add more water.
3. Blend until the paper has been ground into a slightly runny oatmeal-like consistency. Make sure it is not too thick. This mixture is called pulp slurry.
4. If the screen has a frame, pour the pulp slurry into a dishpan. Scoop the pulp with the screen. Spread and pat the pulp on the screen.
5. If the screen does not have a frame, one student should hold the screen taut over an empty dishpan while another student pours the pulp slurry from the blender over the screen. The water should drain through the screen, into the dishpan. Spread and pat the pulp on the screen.
6. Place a couple of pieces of newspaper in the working area and place the screen and pulp on top of them.

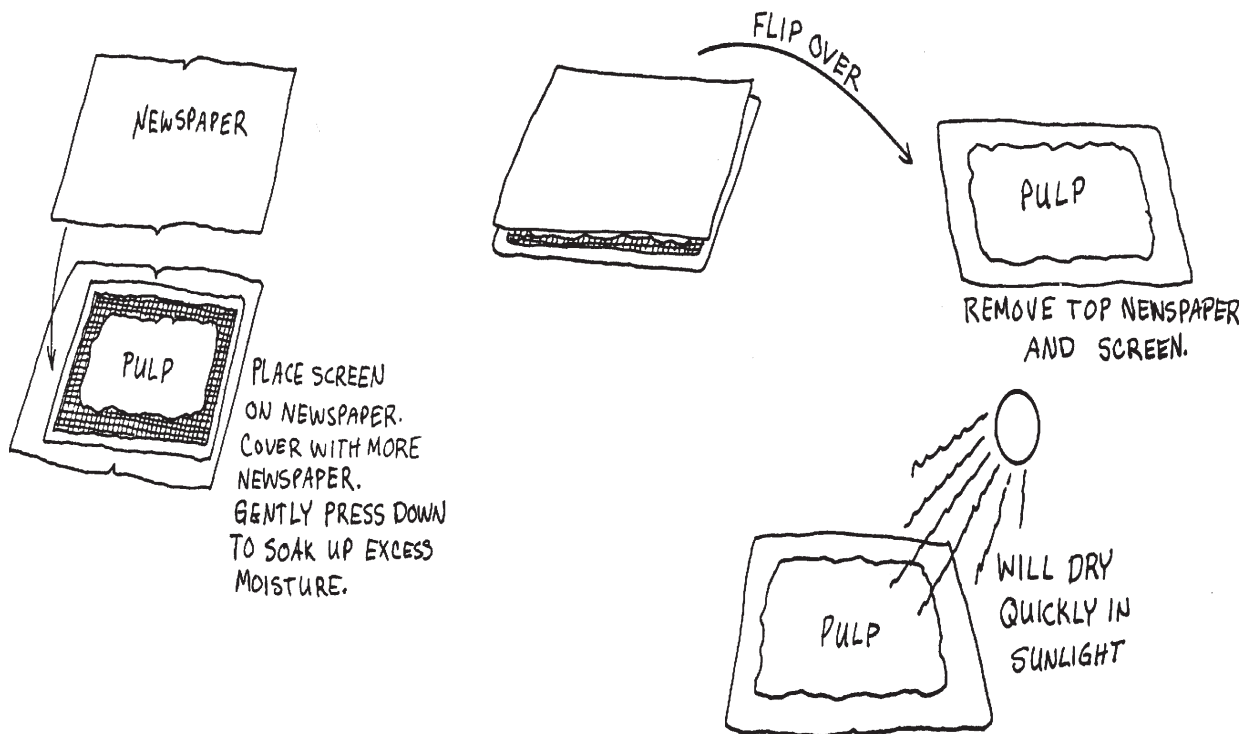
Optional: Press items, such as flowers, leaves, tissue paper, berries, into the recycled paper.



7. Use a couple of pages of newspaper and gently press down on the paper to soak up the excess water or use dishtowels (because the newspaper could leave black ink on white recycled paper).

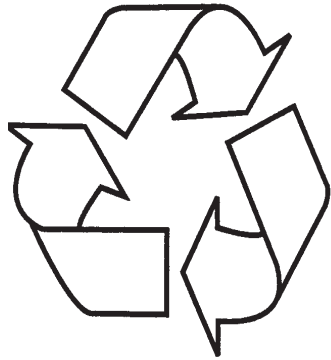
Note: If the paper is pressed too hard, the pulp will separate. At this point you can patch up the holes. Or remove the pulp, roll it into a ball, place it back on the screen, cover with newspaper, and gently press the pulp out again. If the pulp has become too dry, you will need to resoak it in the dishpan.

8. Flip everything over (like flipping a pancake). Remove the newspaper from the top and gently lift off the screen. The recycled paper will be resting on top of the newspaper used to soak up the excess water.
9. Place the recycled paper and newspaper in an area to dry (it will dry quickly in the sunlight). If drying overnight, place a heavy object, such as a book, on the paper to keep it from curling. The recycled paper should lift off easily from the newspaper when it is dry.



CLOSING THE LOOP

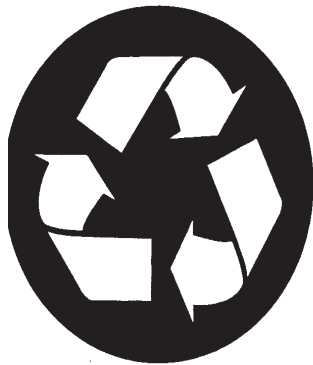
THE MEANING OF RECYCLING SYMBOLS



Carton or paper can be recycled.



The paper is made from recycled paper fibers of a stated percentage and can be recycled.



The package is made from 100% recycled materials and can be recycled.

Each arrow within the recycling symbol represents one step: collection, manufacturing, and purchasing of recycled content materials, in the three-step process. All three are necessary to achieve “Closing the Loop.”

BACKGROUND INFORMATION FOR THE TEACHER

Trees are grown and harvested on “tree farms” specifically for papermaking. In addition to the trees grown just for the papermaking process, by-products from lumber operations, such as wood chips and sawdust, are also used to make paper. To save transportation costs, paper mills are usually located near the forests where the wood is harvested. The trees are debarked, chipped, mixed with chemicals, and processed in a large steam-heated pressure cooker called a digester. This helps to break the wood down into cellulose fibers. The fibers are then rinsed with water to remove chemicals, unwanted wood contaminants, and dirt.

The remaining water-wood mixture, called pulp, is blown onto a screen and shaken to intermesh the cellulose fibers. Water is drained through the screen, and the remaining sheet of paper passes through a series of rollers where it is pressed. Heated rollers dry the paper. The dried paper is cut and placed on smaller rolls or cut into large sheets.

In 1995 approximately 31 percent of residential waste consisted of paper.¹ This wastepaper could have been recycled. The paper recycling process is very similar to the process of making paper from trees. The paper is chopped up and mixed with water to break down the cellulose fibers back into pulp. Then it is put through a series of cleaning and de-inking processes in which water and/or soap-like chemicals (called surfactants) remove the ink from the paper. Once cleaned the water is drained through the screen, and the remaining sheet of paper passes through a series of rollers where it is pressed and dried. The paper is slit into smaller rolls or large sheets. Later it is cut to desired size.

A single piece of paper may contain new fibers as well as fibers which have already been recycled. Papermaking fibers can typically be recycled five to seven times before they become too short to be recycled again.

Successful recycling requires clean recovered paper which is free of contaminants, such as food,

plastic, metal, and other garbage. Contaminated paper can introduce impurities and bacteria into the recycling process. Also, different types (or grades) of paper, such as corrugated boxes, newspapers, and office paper, are kept separate because the different grades of paper are used to make particular types of recycled paper products.²

Recycling paper conserves natural resources, because nearly half of the world’s annual commercial wood harvest is used to produce paper. It saves energy, because it takes 30 to 60 percent less energy to produce the same weight of recycled paper as to make the paper from trees. It reduces air pollution from pulp mills by 74 to 95 percent and lowers water pollution by 35 percent. It also reduces the amount of paper going to the landfill, therefore extending the life of the landfill.³ For additional information about paper and how it is made and recycled, see “Appendix C–VII, Paper.”

Recycling symbols on paper products not only look different but also have distinct meanings. The symbol depicting that a carton is made from recycled paper is white arrows superimposed on a black circle. Three black arrows printed without any circular background also indicates that the paper is made from recycled paper fibers. Three white arrows (with black outline), only with no black circular background, means that a package is recyclable, although it may not be made from recycled materials. The three arrows depict the collection, manufacture, and purchase of recycled materials.⁴

In this lesson students will be making their own recycled paper. Making recycled paper not only teaches students about the recycling process, but it is also a lot of fun.

²“Secondary Fiber Recycling.” Atlanta, Ga.: TAPPI Press, 1993.

³G. Tyler Miller, Jr. *Environmental Science: Working with the Earth* (Fifth edition). Belmont, Calif.: Wadsworth Publishing Company, 1995, p. 346.

⁴E-mail communication from Brian Foran, Associate Waste Management Specialist, California Integrated Waste Management Board, August 26, 1998.

¹“Estimated Average 1995 Residential Disposed Waste Stream Composition.” California Integrated Waste Management Board.

NOTES

LESSON 5: Sounds from Reused Materials and Songs About Reusing and Recycling

LESSON'S CONCEPT

Some discarded products could be reused to make new products and, thus, lessen the amount of material that goes to landfills.

PURPOSE

Through writing and singing songs, students reinforce what they have learned about reusing and recycling various items. They also reuse items to make musical instruments.

OVERVIEW

In this lesson students will:

- Sing “On Top of the Landfill” and talk about what the lyrics mean.
- Use familiar tunes to write lyrics about reusing and recycling materials.
- Learn and sing songs composed by other students.
- Make musical instruments out of discarded items and use them in the performance of their songs.

CORRELATIONS TO CALIFORNIA'S CONTENT STANDARDS AND FRAMEWORKS AND TO BENCHMARKS FOR SCIENCE LITERACY

- Students write songs to communicate to others the importance of reusing and recycling the Earth's natural resources.
 - Students (in grade one should) “write brief expository descriptions of a real object, person, place, or event, using sensory details.” (*English–Language Arts Content Standards for California Public Schools, Kindergarten Through Grade Twelve*, page 8)
- Students design musical instruments out of discarded items and use them in presenting their songs.

- “Discarded products contribute to the problem of waste disposal. Sometimes it is possible to use the materials in them to make new products . . .” (*Benchmarks for Science Literacy*, page 189)
- “By the end of the second grade, students should know that: Some kinds of materials are better than others for making any particular thing.” (*Benchmarks for Science Literacy*, page 188)
- “Earth is made of materials that have distinct properties and provide resources for human activities.” (*Science Content Standards, Grades K–12; Grade 2; Earth Sciences, Standard 3*)
- “Students sing or perform on instruments a varied repertoire of music.” (*Visual and Performing Arts Framework; Music: Creative Expression Component, Goal 3, page 64*)

SCIENTIFIC THINKING PROCESSES

observing, communicating, comparing

TIME

20–30 minutes to prepare for the lesson;
60 minutes or more (depending on the students' involvement) to implement the lesson

VOCABULARY

Select some words from various songs.

PREPARATION

- 1. Read the “Background Information for the Teacher” at the end of this lesson.
- 2. Consider inviting several students from older grade levels to help groups of younger students with lyrics.
- 3. Make a transparency of “On Top of the Landfill” and other songs (at the end of this lesson).
- 4. Optional: Locate and copy noncopyrighted original lyrics to songs, which students can rewrite the lyrics to (most would be campfire-type songs).

MATERIALS

For “Pre-Activity Questions”

- A piece of butcher paper on which to write a list

For “Part I, Writing and Singing Songs About Reusing, Recycling, and Landfills”

- Optional: Obtain one or more tapes listed under “Resources.”

For “Part II, Making Musical Instruments”

Ask students to bring in the following materials for the musical instruments listed below:

- Drum: soup can, oatmeal container or coffee can; balloon; string or rubber band
- Drumsticks: sticks wrapped in cloth and taped with masking tape
- Tambourine: flip tops off soft drink cans or plastic bottle caps, coat hanger wire, tool to poke holes in bottle caps
- Percussion instrument: wood blocks, sandpaper, glue
- Rattle: soft drink cans; rocks, seeds, or beads; tape
- Shaker: plastic containers with lids; dried beans, other seeds, or small stones; or two paper plates, beans, tape
- Clay pot chimes: clothesline rope, small clay pots
- Kazoo: cardboard roll from toilet paper, piece of wax paper to close off one end, rubber band
- Harp: rubber bands or fishing line, tacks, shoe box
- One-string bass: 5 to 6 feet of heavy string or clothesline rope; a large can, bucket, or washtub; a broom handle or dowel rod about 5 feet long

PRE-ACTIVITY QUESTIONS

Ask students what they have learned thus far in this unit about reusing and recycling materials, such as unwanted objects. List their responses on the chalkboard or on a piece of butcher paper and save the list for discussion later. Some of the responses could be used as part of the lyrics for songs. You might also want to generate a list of words that have to do with reusing and recycling that could be incorporated into the songs.

PROCEDURE

Part I, Writing and Singing Songs About Reusing, Recycling, and Landfills

- A. Project the transparency, “On Top of the Landfill,” which is sung to the tune of “On Top of Old Smoky” and lead students in singing the song. Encourage them to share their thoughts about what the lyrics mean. *“On Top of the Landfill” focuses on telling a story about recycling and reducing the waste sent to landfills.*

Note: Another song, written by a class that field-tested this lesson, is provided on page 99.

- B. As a class, select a tune and sing the original song. Then write new lyrics to it, emphasizing reusing and recycling. An example is provided below:
“This Land Is Your Land”—Have students sing the original song; then add verses about keeping our land litter-free and conserving natural resources. For example:

So keep your scene clean,
Clean up your trash,
Then recycle
And get the cash,
And never, never be a litterbug,
‘Cause this land was made for us to love.

Lyrics by Olga Clymire

- C. Make a list of other songs suggested by the class. When possible, obtain the original lyrics to the songs for students. Assign students to work in pairs or triads and have them write or dictate lyrics to a tune with which they are familiar. Students from higher grade levels can come into the class to help the younger students write the lyrics. Some familiar tunes and ideas for lyrics are suggested below:

1. "Twinkle, Twinkle Little Star"
Twinkle, twinkle, little can,
You don't belong in a garbage can.
It is better if you're reused,
Or melted down and corners fused.
Then a new can you become,
Providing food and drink for some.

Lyrics by Olga Clymire

2. "Itsy Bitsy Spider"
(Have students develop hand motions to go with this song.)
Reduce, reuse, recycle
Everything you can,
And you will give the Earth
A nice helping hand.

Lyrics by Cara Morgan

3. "I'm a Little Teapot"
I'm a little blue bin
Short and square
Put me at the curb
To show you care.
Lyrics by Natasha Stillman
4. "Old McDonald Had a Farm" might begin with "Old McDonald had a worm farm . . ." and then carry on with the idea that he used worms for composting.
5. "I've Been Working on the Railroad" might begin with "I've been working in a landfill . . ." and continue about having too much trash to deal with until people started to recycle.

- D. Perform the songs in class, for other classes and, if possible, at school events, such as the kickoff for the recycling program or a parents' visitation night.

Sung to "Are You Sleeping?"
We recycle, We recycle
Paper and, cans and glass.
We won't fill the landfills
or take the homes from animals
With our trash,
With our trash.

Submitted by Ted Schut, first-grade teacher, Ripon Elementary School, Ripon Unified School District.

Tune to "Itsy Bitsy Spider"

The big fat garbage can
is full to the top.
The dump truck comes
and takes it away.
We could recycle the
stuff inside.
So it wouldn't be so
full and our landfill
won't fill up.

Submitted by Lana Best, kindergarten, first-grade, and second-grade teacher, Pacific School, Lincoln Unified School District.

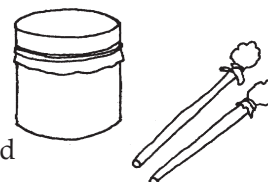
Homework Assignment: Ask students to make up their own songs and share them with the class the following day. They can also illustrate their songs.

Part II, Making Musical Instruments

Help students make musical instruments out of trash and other materials, and have students use these as they sing their songs. They can also sell these at Christmas time or donate them to preschool children to play with.

Drum

Tape sharp edges of a soup or coffee can.
Stretch a balloon over the open end of the can.



Secure the balloon in place by wrapping string or rubber bands around the edge of the can. Drumsticks can be made from sticks wrapped with scraps of cloth.

Tambourine

Use flip tops from soft drink cans or poke holes through plastic bottle caps and string them with wire from a coat hanger. Curve the wire into a circle. Shake the tambourine for sound.



Percussion Instrument

Use discarded wood blocks and cover these with pieces of sand paper. Rub against each other for sound.

Rattle

Fill soft drink cans with rocks, seeds, or beads to make them rattle.

Shaker

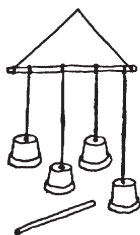
Place dried beans, other seeds, or small stones in plastic containers. Screw on the top and shake. A shaker can also be made with two paper plates taped or stapled together with dry beans inside.



Students in Betsy Weiss's kindergarten and first-grade class at Paden Elementary School decorate their shakers.

Clay Pot Chimes

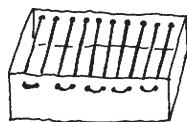
Place rope through several small clay pots. Tie a knot at the end of several pieces of rope. String each rope through a small clay pot. Tie on a wooden dowel or coat hanger in such a way that they could clang against each other. Or hang them up at different levels and use a stick to tap them.



Students in Betsy Weiss's kindergarten and first-grade class at Paden Elementary School paint clay pots before making them into clay pot chimes.

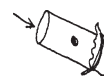
Harp

Attach different sizes of rubber bands or fishing line to a shoe box. Pluck the strings to make sounds.



Kazoo

Use a cardboard roll from toilet paper. Poke a hole on one side. Cover one end of the tube with wax paper and keep in place with a rubber band. Blow through the open end.



One-string Bass

- Make a small hole in the center of a bucket and put one end of the string through the hole toward the inside of the bucket.
- Tie a knot on the end of the string inside the bucket so it won't slip back through the hole.
- Attach the other end of the string to one end of a broom handle.
- Place the other end of the broom handle on the edge of the upside down bucket.
- Twist the broom handle until the string is taut.
- To play: Place one foot on the edge of the bucket opposite the broom handle. Pluck the string. Move the broom handle to change the tension on the string and pluck it again.



APPLICATION

- By analyzing the lyrics that students develop, the teacher can determine whether his or her students understood the concepts presented in this unit. Students can also make a big book of songs they wrote about reusing and recycling and illustrate these. In subsequent years, students in each class can sing songs written by students in previous classes and can add their own pages to the book.
- Ask students to show the instruments to other classes and to explain how they made the instruments and why they made them.

Project Idea: To let others know the importance of reusing and recycling unwanted objects, have students perform the songs written in this lesson for other classes.

- Discuss with students: Why are some kinds of materials better than others for making a particular thing. Have students relate this discussion to the instruments they made.
- Ask students to review the list that they developed at the beginning of the lesson on

what they have learned regarding the reuse and recycling of materials, such as unwanted objects. Are there any statements they want to change, add, or delete?

EXTENSION

If you were able to acquire one or more tapes listed under "Resources," have students learn a song by listening and then singing along with the tape. Select easy tunes and lyrics. You might need to write down the lyrics and project them on an overhead or provide a copy to each pair of students.

RESOURCES

Videos

Dancing with the Earth. The Banana Slugs Video. Santa Cruz, Calif.: Banana Slug String Band, 1992 (40 minutes).

The Banana Slug String Band performs songs, such as "Dirt Made My Lunch" and "Ecology."

Sing Along Earth Songs. Sesame Songs Home Video. Children's Television Workshop, 1993.

Songs sung by Sesame Street characters and includes "Box City Recycling Rap."

Books

Hunter, Ilene, and Marilyn Judson. *Simple Folk Instruments to Make and Play.* New York: Simon and Schuster, 1977.

Describes how to make musical instruments.

Mandell, Muriel, and Robert E. Wood. *Make Your Own Musical Instruments.* New York: Sterling Publishing Co., Inc., 1978.

Describes how to make musical instruments.

Magazine

Cline, Dallas. "Making Simple Folk Instruments for Children," *Music Educator's Journal*, Vol. 66, No. 6 (Feb., 1980) 50-53.

Audiotapes*

The Great Garbage Concert by Glenn McClure. Includes the songs "Reduce, Reuse, Recycle" and "Old McDonald Had Some Trash."

A Kid's Eyeview of the Environment, by Michael Mish. Includes the songs called "Trash in the River" and "Recycle It!"

Recycled Songs by Don Cooper. Uses familiar tunes with lyrics about recycling and other similar topics. Includes the songs called "Don't Throw It Away," "Clean Up the Earth," "Recycle," and "Eco-band."

Songs for the Earth by the Banana Slug String Band. Includes the song "Where Is Away?"

We Recycle by The Van Manens. Includes the song "We Recycle."

*Special thanks to the San Francisco Recycling Program for providing the list of audiotapes. For more information contact the San Francisco Recycling Program at (415) 554-3422.

Picture intentionally deleted.

Students make musical instruments and perform with them in Betsy Weiss's kindergarten and first-grade class at Paden Elementary School.

ON TOP OF THE LANDFILL

On top of the landfill
All covered with trash,
I stacked all my bottles
They fell with a crash.
If I had recycled
Or even reused,
This world that we live in
Would not be abused.

I picked up my bottles,
I picked up my cans,
I looked all around me
And came up with a plan.
Now when I go shopping
For something to drink,
I'll check the containers;
Now what do you think?

And when I need cookies,
Or popcorn for treats,
I'll look for less wrappings;
Now isn't that neat!
So now I'll recycle,
Reduce, and reuse;
My world will be brighter,
Since wisely I choose.

Lyrics by Bonnie Styles's third-grade class, Las Palmas Elementary School,
National School District.



IN ROOM 10 (SUNG TO THE TUNE OF "THIS OLD MAN")

In Room 10,
We reduce,
We won't fill landfills too soon.
If you want to be happy, save your trash today,
In Room 10, we've found the way.

In Room 10,
We reuse,
We don't toss what others might use.
If you think it's trash, then really think again
Before you put it in the bin.

In Room 10,
We recycle,
We recycle all we can.
Paper, plastic, aluminum, and glass,
We will make our resources last.

Lyrics by Lynda Mooney's first-grade class, Las Palmas Elementary School, National School District.



BACKGROUND INFORMATION FOR THE TEACHER

Students might have already taken a familiar tune and rewritten the lyrics on their own or with brothers and sisters or friends just for the fun of it. Assigning them to produce a set of lyrics with a specific subject focus and message can be an engaging assignment in learning about audience, rhythm, vocabulary, understatement and overstatement, and the use of art forms to make informed social statements.

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Having students write and perform songs can open a range of opportunities to involve students who might not otherwise be engaged by a school assignment. It will give students who are interested in music (but who may not participate in the school's music programs) a chance to show their talents. It is an opportunity for students to relate to other students as fellow writers and musicians who might not otherwise work together and therefore find common ground for students who believe they have little or nothing in common. Through collaboration and cooperation, students may gain new respect for each other and for the demands of creating a finished piece of art.

The music that students develop can be of any type and in any tradition: rock, rap, waltz, blues, bebop, jazz, folk, classical. The words may be serious or comic. The performance can be accompanied by homemade musical instruments. These choices can be made by the teacher to suit the needs of the class and the school, working within what is logistically practical.

The teacher may assign existing tunes or have the students suggest some that would be fun to adapt. Whatever the choices, students should be encouraged to explore the content of their lyrics.

Picture intentionally deleted.

At the Solar Community Housing Association, Homestead CO-OP, children play the drums that they designed from reusable materials.